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Infantry

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An Infantry fit for service in the field must be able to maneuver, must be capable of operating with certainty and dispatch on all kinds of ground, and must be able to adapt its formations to circumstances and to accommodate itself in the simplest manner to the most unexpected conditions without losing its cohesion.

USAIS

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Commandant's NOTE

Major General James J. Lindsay
Chief of Infantry

INFANTRY TRAINING CENTER

The Infantry soldiers graduating from today's 13-week Infantry OSUT (one-station unit training) program are the best I have seen in my 32 years in the Army. Making them the best is one of the essential tasks of the United States Army Infantry Training Center.

The professional drill sergeants and other cadre members at the Center see that these soldiers are totally immersed in training. This means constantly supervising them, correcting them on the spot when they need it, counseling, encouraging, motivating, disciplining, and caring for them. In short, it means taking a group of civilians and training them — in 13 weeks — to act, look, and *think* like soldiers so that they will be ready to take their places as Infantrymen in the Army's combat units.

The Center's training is conducted in four phases, with each phase integrating the skills the soldiers have learned in the previous phases. This cumulative process begins with the soldierization phase, employing skills the soldiers need to survive on the battlefield. These include physical training (which begins each training day of the 13 weeks), first aid, probing for mines, NBC tasks, and basic rifle marksmanship.

In the general subjects and individual training phase, the soldiers familiarize themselves with the M203 grenade launcher, the M60 machinegun, and the M72A2 LAW (Light Antitank Weapon). Antiarmor training, which includes the tank rollover course, is designed to instill confidence, and to teach each soldier, acting as part of an armor killer team, the proper techniques of engaging armor targets. Also in this phase, the new soldiers are introduced to camouflage, individual movement techniques, reaction to flares, and how to negotiate obstacles.

During the MOS-specific training phase, the MOS 11B soldiers go into squad tactical training, in which they learn to move as members of a squad. They participate in a squad live fire assault course and in a day and night squad defensive live fire problem. Their tactical training culminates in the Infantry Squad Mission, a series of situational offensive exercises designed to integrate and reinforce individual and squad-level skills.

Meanwhile, the soldiers selected to be 11C mortarmen receive 120 hours of training and gunnery qualification on the 81mm mortar. Later, they are introduced to the 107mm mortar, the fire direction center, and forward observer procedures.

During this training phase, selected soldiers receive additional antiarmor training with the Dragon (11BC2), the TOW (11H), and the Improved TOW Vehicle (11HE9). This particular training ends with a live fire exercise during which some of the soldiers engage targets using these weapon systems.

Toward the end of this final training phase, other 11B soldiers are selected to receive training on the Bradley IFV immediately after their graduation. During this three-week add-on course, conducted by the Infantry Training Group, these soldiers receive instruction primarily in performing operator maintenance and in learning how to drive the vehicle, both during the day and at night. Those soldiers who successfully complete this additional training have their 11B MOS changed to 11M.

The Center's emphasis on tactical realism, its reinforcement and integration of previously learned subjects into subsequent blocks of instruction, and its use of after-action reviews are all designed to improve the overall technical and tactical proficiency of new Infantry soldiers. These methods have proved most effective. At the end of the 13 weeks of training, for example, our average Infantry trainee has scored 268 out of 300 points on a rigidly enforced final APRT, and 92.4 percent on the tough, performance-oriented Infantry qualification test (POIQT) of 32 critical Skill Level 1 tasks. (In the future, a mid-cycle test on 20 tasks and an end-of-cycle test on 25 tasks will replace the POIQT.)

In short, by the time these soldiers graduate from Infantry OSUT they have been trained on all the entry-level Skill Level 1 tasks. The rest is up to their field leaders and commanders.

So that these commanders will know as much as possible about their new soldiers, each OSUT graduate is given a packet of information to take to his new commander. One of the things this commander's packet contains is a TRADOC Form 578-R. This form lists the tasks on which the soldier has been trained and shows his score on each of those tasks.

Also in the packet (in addition to vital administrative information) are the soldier's APRT (Advanced Physical Readiness Test) card and a weapons qualification card for each weapon on which he has qualified. (All soldiers, for instance, qualify on the M16 rifle, while MOS 11BC2s qualify on the Dragon, 11Hs on the TOW, and 11Cs on the 81mm mortar.)

Although these new soldiers are well-disciplined and well-motivated, they must be trained on the remaining Skill Level 1 tasks. They must also be integrated into the collective and individual training programs of their units to hone the skills they have already learned; they must be taught higher level skills; and they must be imbued with a team spirit that can only be developed through a challenging unit training program.

With the high standards set by our units and with leaders who lead by example and provide the right motivation, I can assure you that the Infantrymen we graduate will make the best fighting men in the world.

INFANTRY NEWS

THE ARMY'S NONCOMMISSIONED OFFICER EDUCATION SYSTEM (NCOES) is undergoing some changes.

For one thing, the Primary Leadership Course (PLC) and the Primary Noncommissioned Officer Course (PNCOC) are being combined. The new course, called the Primary Leadership Development Course (PLDC), has been validated and will be implemented in the near future.

Another change involves the Advanced Noncommissioned Officer Course (ANCOC). In the past, each of the ANCOCs at different locations included tasks that met only the needs of the particular MOSs at those locations. But the Department of the Army wanted to develop a set of core tasks that would be taught to all of the ANCOCs.

This idea has been adopted, and the core curriculum will include six major categories: Leadership and human relations, effective communications, training management, resource management, professional skills, and military studies. The specific subjects that fall into these categories include, for example, the duties, responsibilities, and authority of the NCO; the NCOES and the NCODP; maintenance and supply management and the EPMS; safety; field sanitation; survival as a POW; land navigation; and NBC and tactical skills.

Since many of these tasks were already a part of the Infantry ANCOC, imposing the core curriculum on the course at Fort Benning caused only a few changes. The few tasks that were not being taught are now being phased into the curriculum.

Also being phased into the Infantry ANCOC curriculum is another change: The platoon sergeants and operations sergeants (or student NCOs about to take over these jobs in a unit) will no longer be taught Skill Level 1 and 2 tasks as they have been in the past. They will be given instruction, however, in how to teach those tasks more effectively to the soldiers in their units.

Too, the new Army Regulation 351-1, Individual Military Education and Training, 15 January 1984, with an effective date of 15 February 1984, has recently been distributed to the field. This new regulation updates the policy that governs the qualifications for attendance at the various NCOES courses, adds information about the PLDC, and includes the adoption of the term "individual training and evaluation programs" (formerly known as skill qualification training). Several paragraphs have been added to cover Reserve Component NCOES training.

Battalion commanders and command sergeants major will be particularly interested in the Regulation's Paragraph 6-15, which tells them how to select the right soldier at the right time to receive the right training. It requires them to set up an Order of Merit list at battalion level (or equivalent) for courses for which they have the selection authority — PNCOC, PLC, BNCOC, and, when it is implemented, PLDC. And it tells them the qualifications their soldiers must have before they can be put on such a list.

The regulation also spells out their responsibilities toward their NCOs who are selected to attend an advanced NCO course, and specifically states that "soldiers who are not qualified will not be sent simply to fill a quota."

THE NATIONAL INFANTRY MUSEUM has given us the following items of interest:

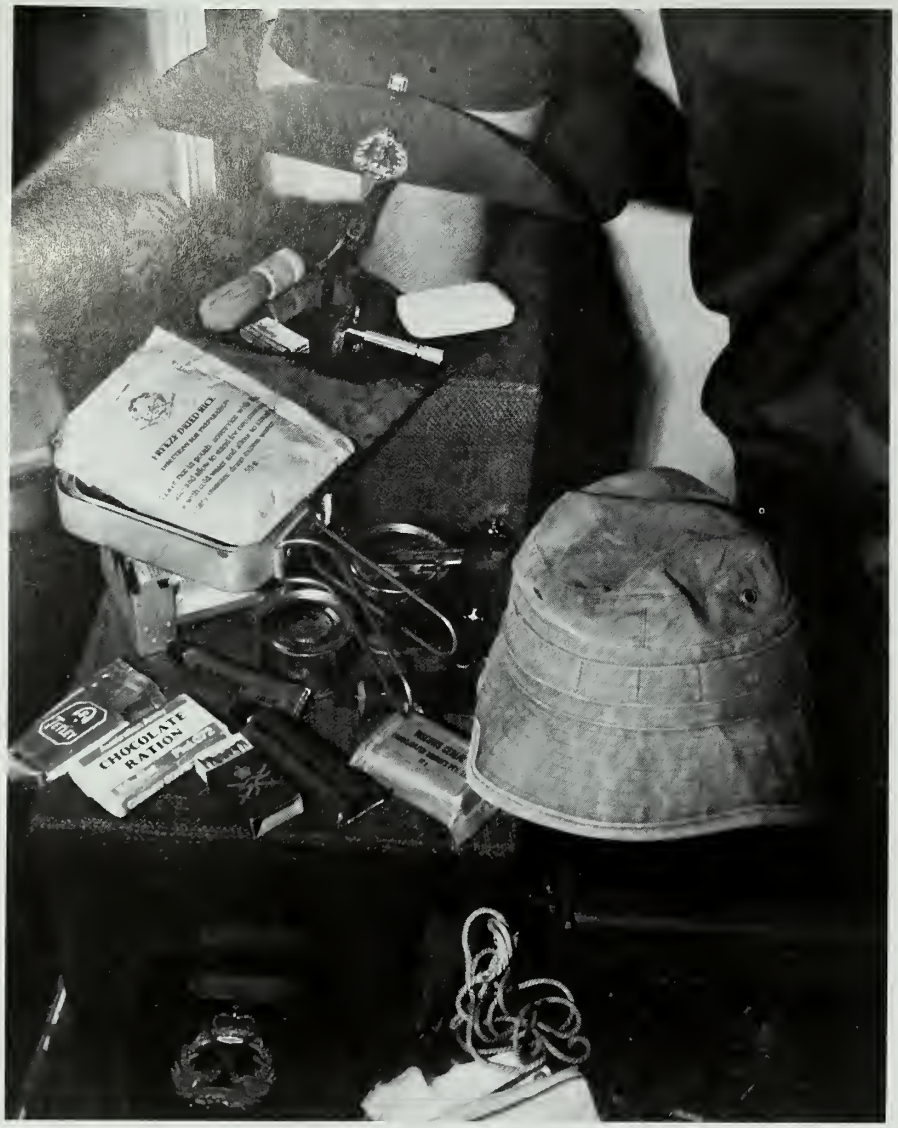
A number of items of historical property have been transferred from the Ranger Department at Fort Benning to the National Infantry Museum. Some of these will be used in a Ranger display that is being planned for a later date.

Plans are proceeding for the ceremony to honor the holders of three Combat Infantry Badges. A good deal of interest has been expressed and planners hope that a number of the recipients will be present when the plaque honoring the three-time badge holders is unveiled. When the plans have been completed, an advance notice will be sent to those concerned. Lieutenant General David Grange is the only three-time badge holder still on active duty.

Eleven World War I etchings by Lester G. Hornby have been added to the Museum's growing collection of military art. These valuable pieces were donated by Bernard J. Sandler, and will join those of such other important artists as Jo Davidson, Charles McBarron, W. Gilbert Gaul, Henry Gasser, and Aaron Bohrod.

Another valuable donation was a collection of original documents, news clippings, and photographs concerning the efforts made by John A. Betjeman in getting and keeping Fort Benning established during its early days. These were donated by Jack A. Bell of Columbus.

An important recent acquisition is a collection of Australian Infantry equipment of the kind used by Australian soldiers during the Vietnam War. Among the pieces are a small cookstove, 24-hour rations, machete, bayonet, and one of the famous 9mm Owen machineguns, which was adopted by the Australian Army in 1941 and used by Australian Infantrymen in World War II, Korea, and Vietnam. The Owen was used for



Portion of Australian exhibit at the National Infantry Museum.

the last time in combat by Australian forces attached to the U.S. Army's 173d Airborne Brigade in Vietnam. The collection was presented by the Australian Exchange Officer at Fort Benning, Major Philip J. McNamara.

The National Infantry Museum Society, formed at Fort Benning a number of years ago to assist the Museum with financial and volunteer support, is open to anyone who is interested in joining. The cost is $2.00 for a one-year membership, or $10.00 for a lifetime membership.

Additional information about the Museum and the Society is available from the Director, National Infantry Museum, Fort Benning, Georgia 31905, telephone AUTOVON 835-2958, or commercial 404/545-2958.

THE ARMY/AMERICAN Council on Education (ACE) has established an automated transcript system called AARTS to provide active duty service members, soldiers separating from the service, and veterans with a document that itemizes their military training and educational achievements during their service in the Army.

The output is a hard copy transcript that will consist of, but not be limited to, a description of a soldier's military training courses, MOSs, college level tests, and his other achievements, along with the associated ACE credit recommendations. The transcripts will be produced by a Department of the Army data processing activity.

The production and distribution of these transcripts will support colleges and universities that receive applications for admission and requests for credit from soldiers or veterans; civilian employers who might be considering hiring a veteran; the Army's pre-separation counseling program; and Army Education Centers that provide in-service counseling. The transcript system will also produce management and statistical reports that will support the Education Directorate, the major Army commands, and education service officers.

Since the transcript will be certified by ACE, its use should significantly increase the amount of college credit awarded to soldiers for their military experience. The descriptions and recommendations developed by ACE should also make it easier for potential employers to evaluate the applicability of veterans' military experience.

AARTS is currently under development with the first transcripts planned for the spring of 1984. The system will be operated for The Adjutant General's Office, Education Directorate, by the Army's Training and Doctrine Command at its Fort Leavenworth computer facility.

THE 25th INFANTRY DIVISION recently opened a new training site at Schofield Barracks, Hawaii. It is the Bayonet Assault Course, officially opened on 29 November 1983.

The soldiers of Company B, 1st Battalion, 5th Infantry, with help from Company B, 65th Combat Engineer Battalion, developed the bayonet training program and built the course.

The Bayonet Assault Course contains two major training areas. In one, the soldiers are trained in the primary bayonet techniques, and includes practice targets and a hand-to-hand combat pit. When a unit completes its

25th Division soldiers demonstrate basic bayonet maneuvers.

preliminary training — usually about six or eight hours — it moves on to the actual assault course.

The course, set in a wooded area, has eight targets and ten obstacles, including log cribs, barbed wire, and hurdles. Smoke grenades, artillery simulators, and an M60 machinegun firing blanks are used to add realism to the training.

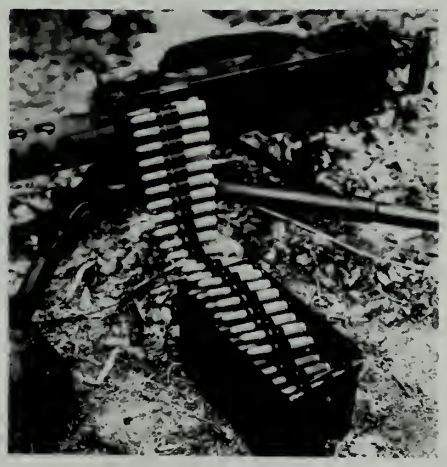
THE U.S. ARMY AVIATION LOGISTICS SCHOOL (USAALS) was established at Fort Eustis on 1 October 1983 as part of the Aviation Branch implementation. Its resources were furnished by the Army's Transportation School, which was formerly responsible for aviation logistics development and training.

The new school signifies the emerging prominence of aviation as a combat arm. It is dedicated to supporting the new branch and to coordinating aviation logistics with the Army's overall logistics program. The School is responsible for all career management field (CMF) 67 and officer specialty code (OSC) 71 training development, combat development, and resident and nonresident instruction.

The Aviation Maintenance Officer Course is being redesigned to establish an Aviation Logistics Officer Course (AVLOC) for OSC 71 officers. The revised officer course and a "how to support" seminar to be conducted this spring are among the School's highest priorities.

PICTATINNY ARSENAL in Dover, New Jersey, has developed .50 caliber plastic practice ammunition. The ammunition — M858 ball and M860 tracer cartridges — was type classified on 24 May 1983 and is expected to be in the hands of the troops by September 1984. Units in West Germany will be the first recipients.

The ammunition was developed by the Arsenal's Fire Control and Small Caliber Weapon Systems Laboratory (FSL) under the auspices of the International Material Evaluation Program. The rounds originally were to be standard off-the-shelf commercial items made by Dynamint Nobel AG in West Germany. But because of performance and safety problems, the Laboratory recommended that certain modifications be made to the materials in and configuration of the plastic cartridges. The improved cartridges were tested and met the Training and Doctrine Command's requirements.



Plastic training cartridges are fed into an M2 .50 caliber heavy-barrel machinegun. Every fifth round is a tracer.

The rounds consist of a metal cartridge head and primer that are press-fitted into a plastic outer case, which is integrated into one piece with the projectile and a plastic inner case with propellant. The tracer round also contains trace materials that exhibit a bright trace for more than 200 meters during flight.

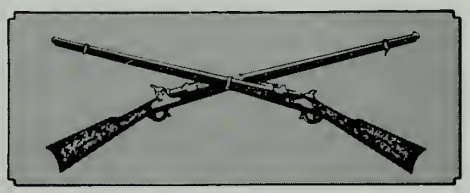
The average muzzle velocity of the cartridges is 830 meters per second. The accuracy of the plastic practice round at 150 meters is the same as that for the service-grade .50 caliber M33 ball and M17 tracer rounds at 600 meters.

The maximum range in terms of range safety for the plastic practice round is 700 meters. The round tip of the plastic projectile aids in keeping it within a short range by increasing drag, which causes a rapid drop off in velocity.

To use the rounds in the M2 heavy barrel .50 caliber machinegun, the weapon must be fitted with the XM3 recoil amplifier barrel assembly. This is assembled to the gun in much the same way as the standard barrel, the only difference being the use of three toggle-type bolts to secure the recoil amplifier chamber to the barrel support. The recoil amplifier barrel has gas ports that bleed some of the gases generated by firing into the recoil amplifier chamber, which provides a gas assist to the recoil operation of the machinegun. The force generated by the bled gases causes the barrel to recoil and the gun to function. Without the recoil amplifier barrel, the weapon could not be fired automatically with the plastic practice ammunition.

A special discriminator must also be added at the front of the feed tray. This device prevents the feeding of service rounds, which are slightly longer than the plastic rounds. Thus, it allows the feeding of the plastic rounds into the weapon and it serves as a safety feature.

The .50 caliber plastic practice ammunition will be used to support reduced-range gunnery training on tank and infantry weapon systems including target zeroing techniques, target engagement techniques, reaction to direct fire, and burst on target training.



ANCOC:
A Student's Viewpoint

STAFF SERGEANT MARK S. WAFLER

One of the many courses taught at the U.S. Army Infantry School at Fort Benning is the Advanced Noncommissioned Officer Course (ANCOC) for soldiers in the 11 series MOS. Currently, it is a ten-week course for NCOs in the ranks of staff sergeant, sergeant first class, and platoon sergeant who have been selected to attend by the Department of the Army.

The purpose of the course is to prepare these soldiers to serve as platoon sergeants in infantry units, or as assistant operations sergeants at the battalion level, and to introduce new and existing doctrine in an effort to standardize training in the Army today.

Recently, while attending ANCOC, I was asked if I would be interested in writing an article on the course itself, strictly from a student's point of view. I welcomed the opportunity to express my feelings on the good points and the bad points of the course and to voice my recommendations in a way other than the standard end-of-course critique sheets. At the same time, I feel I can offer advice to NCOs who are selected to attend future ANCOC classes.

Since an 11B MOS includes soldiers who perform a variety of tasks, our class covered the entire spectrum of possible jobs and experience. We had soldiers who had never served in a TOE unit and others who had never served in anything but TOE units. We had combat veterans, those who wished they were combat veterans, and those who hoped they never would be. This wide variety of people and experience both helped and, at times, hindered the class. We did not all share the same ideas and viewpoints on the different subjects taught, but if a job was not represented by at least one NCO in our class, the chances are it did not exist in the infantry.

GETTING STARTED

Inprocessing, in any Army school, is always a difficult time. There are numerous introductions and briefings, and numerous forms to be filled out. Our class was no exception. I was surprised, though, at the smooth organization of the class into squads and platoons and at the establishment of the student chain of command. It was a well-thought-out plan.

The chain of command for our class was selected by rank and then by time in grade and did not change throughout the course. Some students thought the leadership positions should have been rotated periodically as they are in many Army schools, but I believed that rotating the chain of command was not only unnecessary, it would have only made for confusion. The function of the chain was strictly administrative — such as checking the daily status of the class, making sure everyone received training schedules, and dispensing the mail — and once the people in the chain became comfortable with the routine of their positions, rotating would have served only to hinder the smooth operation of the class.

During the first two days, we received briefings from several people, ranging from the post sergeant major down to the chief of the advanced course, and the bulk of their briefings consisted of how to be relieved from the course for misconduct. The rules were laid down hard.

Our class as a whole did not think this type of briefing was necessary for senior noncommissioned officers, and as a result our attitude toward the course was not favorable for many weeks afterward. What we failed to realize at the time, though, was that those harsh words were directed not at the NCOs in the class who would conduct themselves in a professional manner, both on duty and off, but at those

few who would not. Spelling out the rules of conduct, therefore, seems to be a necessary evil.

For the first week our days began at 0500 with physical training. Since every student in the course eventually had to pass the Army Physical Readiness Test in accordance with Army standards for his age group, it was obvious to all of us that we were going to be tested at some time during the next ten weeks. In fact, we were tested on the very first Saturday after we signed in.

PHYSICAL TRAINING

The NCOs who passed this first PT test had their PT schedule changed to three times a week — on Mondays, Wednesdays, and Fridays. Those who did not had PT on those three days plus remedial sessions on Tuesday and Thursday of the next week, and they were given another opportunity to pass the test on the second Saturday. The NCOs who did not pass the second test were scheduled for remedial PT for several more weeks before being tested again.

Most of the subjects taught were presented in the classrooms in Infantry Hall, with welcome breaks from this routine in the form of hands-on training at different ranges and training areas throughout Fort Benning. (I would have preferred more of the field environment than the classroom, because it seemed easier for me to grasp the subjects outdoors than indoors.)

One of the most difficult tasks I encountered during the course was making the adjustment back into an academic environment. Terms such as *pretest, post test, retest,* and *reclama* — words I had almost forgotten — were now part of my daily vocabulary. It was sometimes difficult to keep alert during the classroom instruction and to understand what was being presented. There were times when I felt like I was drowning in tasks, conditions, standards, and learning objectives, although it was comforting to find there were many others in this same category.

Our program of instruction (POI) began with an assortment of leadership classes and continued with subjects such as the Army maintenance system, battalion training management systems, NBC, military justice, communications, and tactics. We conducted hands-on training in weapons, demolitions, and the M47 Dragon. We installed hasty minefields and then retrieved the mines and went through a land navigation exercise.

The highlight of all the instruction we received was the field training exercises during the course. For four days we were involved in mechanized infantry tactics, both offensive and defensive, and conducted an exercise on small unit patrolling, complete with an airborne operation for those in the class who were on jump status in their parent units.

The best times were those days in the field, away from the monotony of the classroom. It was then that the members of my platoon really began to work and pull together and to develop a deep sense of camaraderie.

As far as the subjects were concerned, overall, most of the students I talked with thought too much time was spent on Skill Level 1, 2, and 3 tasks and not enough time on Skill Level 4 tasks. After all, most of the NCOs in the course had been training soldiers on Skill Level 1 through 3 tasks for years, and this instruction to them was not only insulting but a waste of valuable time. My recommendation would be to include in the course a nontestable period of instruction on certain Skill Level 1, 2, and 3 tasks for familiarization and to spend more time on the Skill Level 4 tasks. Perhaps when a revised POI is introduced this spring, there will be some changes in this portion of the course. [NOTE: There will be. See the INFANTRY News section of this issue.]

Once we left the subject of *what* was taught and started talking about *how* it was taught and who taught it, opinions varied considerably. The subject being taught also played a big part in how well the instructor made his or her point. A boring subject with a good instructor was still a boring class; the instructor simply made it easier to get through.

I think I can safely say for my class that the good instructors were great and the bad ones especially bad. Fortunately, we found few of the latter. Unfortunately, though, we seldom exercised the option of writing a statement on a class for submission up through the chain of command for action.

The final point that needs to be mentioned on the instructional portion of the course was the elapsed time between instruction and testing. It was not uncommon during the course for the testing on a subject to be several weeks after the subject had been taught. We should have organized ourselves into study halls or study sessions after hours or on weekends to a greater extent. We had plenty of time off and could have used it better by holding more study sessions. Those we did hold were invaluable in bridging the gap between the teaching and the testing.

ADVICE

On the basis of my experience in this course, I have some advice to offer to those NCOs who plan to attend ANCOC any time in the near future:

First, if you can find a copy, read "The Advanced NCO Course" in the January-February 1984 issue of INFANTRY, in which you will find official advice from the NCO Academy staff on what to bring with you to the course. Note especially the part about weight standards. If you are now overweight, make every effort to see that you can meet the weight standards by the time you report, or that you have with you your skin caliper tests.

In addition to the items listed in the article cited above, you will find there are other handy items you might want to bring:

- Highlighters, in several different shades if you can find them, to use in the classroom to mark important material.
- A good mechanical pencil with a fine point for map reading exercises

and land navigation. (When you're working with ten-digit grid coordinates, a fat-tipped pencil may make the difference between a right answer and a wrong one.)

- Tabs to use in marking manuals for quick reference. (These will make life much easier for you, especially during the maintenance exam.)
- A good straight-edge.

Probably the most important item, and one that you can't find in any PX or bookstore — is a good attitude. Without it, no matter how many notebooks and pencils you have, you may fail to accept what is presented. Resolve not to be turned off or insulted by the initial briefings in which the rules of the course are laid down. As the course progresses, you'll notice that those few NCOs who either didn't listen or just didn't care will start packing their bags to go home. Resolve, too, to take good notes and stay interested.

On the subject of physical fitness, make sure you can pass the PT test before you sign in, and if you cannot, you need to work on it on your off time until you can. The cadre at ANCOC will give you every opportunity to pass the test before graduation, but you need to keep in mind that it *is* a requirement for graduation.

Next, do take advantage of your option to write specific statements about inadequate instructors and send your comments up through the chain of command. If a statement is in writing, most likely, action will be taken. (And don't hesitate to compliment the good instructors.)

For the most part, ANCOC is run by the NCOs in the class, and since the class is made up of senior noncommissioned officers, or those who will be shortly, this is only right. But don't assume from this that formations and inspections do not exist in the course. They do. Be prepared for daily accountability formations and for several in-ranks inspections, in both BDU and class "A" uniform. (If AR 670-1 has become a stranger to you lately, you would be wise to become reacquainted with it before you get to Benning.)

Overall, I was pleased that the course did not live up to the awful war stories I had heard about it. It was well worth my time, and it opened my eyes in many areas. Granted, not everyone who attends the course comes into it with exactly the same experience level and not everyone will benefit from the course in the same way. But I don't think there was anyone in my class who could honestly say he did not learn anything from the course that he could take back to his unit.

With people like the post sergeant major, the School Brigade sergeant major, and all the NCO Academy cadre trying to make the course the best it can be, it is obvious that the advanced noncommissioned officer course can only get better for those who will attend it in the future — if their attitude is right from the day they sign in.

STAFF SERGEANT MARK S. WAFLER recently graduated from the Advanced Noncommissioned Officer Course and was on the Commandant's List. He is now assigned as a platoon sergeant in the Benning Ranger Division.

Make the NCODP Work

COMMAND SERGEANT MAJOR ROY C. OWENS

Many of us in the Army talk about the Noncommissioned Officer Development Program (NCODP), but too few really understand what the program is intended to do.

Depending on who you talk to, an NCODP should do as little as to get a unit's NCOs together once a month for identity's sake, or as much as to plan every minute of training these NCOs need on any given subject.

Unfortunately, many leaders fall into this latter category — they believe their NCODP should be designed to satisfy all of their NCO training needs. And too often they single out the technical skills their NCOs appear to be weak in. These might include such subjects as MOPP levels, land navigation, or current events.

But the fact that some NCOs have deficiencies in certain basic technical skills does not necessarily mean the NCODP is at fault; neither does it mean the NCODP should be used to try to correct those deficiencies. Unit commanders, as they always have, must simply provide time on their training schedules for such individual training, just as they do for collective training.

But if the NCODP is not designed to substitute for individual or collective training, what *is* it designed to do? It is supposed to be used to improve a unit's efforts in teaching and maintaining those skills. It is also intended to support our service schools in their efforts to restore and develop the basic professional qualities historically and routinely found in the Army's noncommissioned officers — qualities

that enable them to BE, KNOW, and DO. To put it simply, NCOs must have a good knowledge of the basic leadership qualities and the necessary skills, devotion, and courage to apply them.

Many of the professional and training problems we have with our noncommissioned officers will disappear if we keep the main objective of our NCODPs focused on those leadership principles. In any NCODP, the subjects selected for discussion and training need to serve primarily as ways to promote the NCOs' understanding of how to BE, KNOW, and DO. But if we aim only at making our NCOs technically competent through task training, we will never get to the program's main objective of training — to make our NCOs more effective and professional. Besides, the skill tasks that any NCO must be proficient at are too numerous for him to learn during the relatively short time that is provided for most NCO development programs.

If we are to fulfill the intent of the NCODP, then, we must first understand its main objective, which is to help our NCOs understand their roles as leaders. We NCOs, therefore, must understand our responsibilities to our soldiers, our leaders, our units, the Army, and the noncommissioned officer corps. In addition, we must understand our personal responsibilities for self-development and the capability of the NCO support channel. Finally, and most important, we NCO's must understand the need to share our experience and know-how with each other, and especially with our junior noncommissioned officers.

The NCODP is an excellent solution to the real problem of developing noncommissioned officers, but only if it is properly understood and implemented. If we keep its objective in sight and if we all strive to attain that objective, we will soon see more of the kind of results we can all be proud of.

COMMAND SERGEANT MAJOR ROY C. OWENS is command sergeant major of the U.S. Army Infantry Center at Fort Benning. He formerly served as command sergeant major of the 1st Battalion (Mechanized), 87th Infantry, 8th Infantry Division, in Germany.

The Bradley Master Gunner

CAPTAIN JOHN F. D'AGOSTINO

With the introduction of the Bradley Infantry Fighting Vehicle into the Army's inventory, the assets available to the infantry commander in the field have increased dramatically. Mechanized infantry units can now fight from a vehicle and still maintain their traditional role of dismounted combat.

The Bradley's M242 25mm chain gun with its armor piercing and high explosive rounds, coupled with the M240C 7.62mm coaxial machinegun, can cause havoc in the ranks of both mounted and dismounted enemy infantrymen. And the TOW missile launcher mounted on the left side of the turret can defeat any known enemy armored vehicles out to a range of 3,000 meters.

With all of these new systems the Bradley has clearly presented many challenges to the infantrymen in the field. Never before have these soldiers had a stabilized turret to work with, and never before have they had a weapon such as the 25mm chain gun. In short, to use the BIFV effectively infantrymen now have to be completely reeducated in gunnery techniques and unit training. And the Bradley master gunners assigned to battalions and companies play an important part in that reeducation.

These master gunners are highly motivated, highly trained noncommissioned officers who have successfully completed the 12-week Master Gunner's Course at Fort Benning and have been awarded the ASI (additional skill identifier) of "J3." (In most cases the master gunners at battalion level are sergeants first class while those at company level are staff sergeants who are assigned the master gunner job as an additional duty.)

To attend the course, an NCO should have at least four years of experience in mechanized infantry units, with some time as a mechanized infantry squad leader or platoon sergeant. He should be a volunteer and must be recommended by his battalion commander.

If selected, he will attend the course on a temporary duty (TDY) basis — not enroute to a new unit — and he should be retained in his unit for two years after he completes the course.

There is a good reason for this rule: As a master gunner, he will work hand in hand with either his battalion commander or his company commander, and it is important that he have a good relationship with them from the beginning.

The Bradley Master Gunner's Course at Fort Benning is 12 weeks long and includes a total of 502 hours,

broken down as shown on the accompanying chart.

Highlights of the course include swimming the BIFV; conducting operator and organizational maintenance; training on all weapon systems, on the simplified test equipment (STE), and on boresighting and range operations; conducting a squad combat qualification exercise; and developing a unit assessment and a unit gunnery training program.

The course is demanding and the standards are high. A student must receive a "GO" in all of the hands-on tasks and must maintain an 80 percent average on all of the written examinations. Each student is allowed one retest for each task or examination on which he has received a "NO-GO." If he fails the retest, his file is forwarded to an academic board, which may recommend his dismissal from the course.

(In the future the Master Gunner's Course at Fort Benning may be revised to include live fire exercises under NBC conditions; reverse cycle training to make the best use of the thermal night sight; and instructions on the Conduct of Fire Trainer (COFT), which is scheduled for fielding early in 1985.)

Once an NCO has completed the course and has become a master gunner, he is qualified to serve as the primary advisor to his battalion commander and battalion S-3, or to his company commander for all gunnery training. He will then be knowledgeable in all organizational maintenance aspects of the vehicle and its weapon systems.

SUBJECT	HOURS
Introduction	3
Hull and turret operations	18
Training management	46
Range operations	50
Strategic deployment/NBC	12
Prefire/preliminary gunnery	42
Target engagement (live fire)	136
Gunner's skill test	16
Student oral presentations	21
Maintenance (vehicle and weapon)	101
Examinations	45
Administration	12
Total	502

It must be pointed out, however, that although he is an accomplished troubleshooter, he is neither a mechanic nor a supervisor of mechanics. His job is to identify maintenance problems in the vehicle and its weapon systems that could adversely affect the mission of the unit.

The master gunner is not a tactician, either. Nowhere in the course is tactics addressed. But he is a gunnery and maintenance subject matter expert who, given tactical guidance by the commander and the S-3, will be able to develop gunnery techniques that can be integrated into the realistic combat scenarios designed by the operations officers.

The master gunner is also a trainer. He has been taught the rudiments of the battalion training management system (BTMS), and he is fully competent in all aspects of range operations, ammunition management, and target systems. And if, in the performance of his duties, the master gunner encounters a situation that he does not know how to handle, he can write or call the Master Gunner Branch at Fort Benning for up-to-date information concerning the vehicle.

General comments and questions about the master gunner position and the Master Gunner's Course are always welcome. All inquiries should be addressed to Commandant, U.S. Army Infantry School, ATTN: ATSH-W-BFV (MG), Fort Benning, Georgia 31905; or telephone to AUTOVON 784-6201 (Commercial: 404/544-6201).

CAPTAIN JOHN F. D'AGOSTINO, a 1978 graduate of the United States Military Academy, is chief of the Master Gunner Branch of the Weapons, Gunnery, and Maintenance Department of the Infantry School. Previously, he served in various command and staff positions with the 3d Infantry Division in Germany.

Ranger Desert Phase

CAPTAIN WILLIAM D. PHILLIPS

When Ranger School graduates sit around talking, they like to exchange "war stories" about how tough their training was:

"When I went through, we had to walk 50 miles a night on one C-ration a day."

"Oh yeah? When I went through, we didn't sleep a minute for 60 days."

"That's nothing. When I went through, we each had to swallow a live hand grenade before we could get the tab."

Well, in the future all you old time Ranger graduates will have to be on the lookout for new Ranger graduates with even better tales to tell — the graduates who have been through the new Desert Phase of the Course, now being conducted near Fort Bliss, Texas.

Previously, the Ranger Course was divided into three phases — the Benning Phase, the Mountain Phase, and

Ranger replaces a 30-round magazine as he crawls forward during desert live fire raid.

the Florida Phase — which exposed the students to three different types of terrain and climate. (See "The Ranger Course," by Captain Ernest W. Cooler, INFANTRY, September-October 1980, pages 30-36.)

But Infantry School leaders, with an eye on world events and potential hot spots, realized that Rangers should also be exposed to the terrain and climate of the desert and instituted this fourth phase of training in March 1983. These leaders knew that well-trained light infantry forces in desert regions could prove invaluable in such behind-the-lines operations as reconnaissance patrols, raids, and ambushes. They felt that desert Ranger training would emphasize the great offensive potential of these operations, and that the hardship of the terrain and climate would be a challenge to leadership training.

To add the seven-day Desert Phase to the other three phases, the Ranger Department took five days of patrolling operations from the Mountain Phase and used the administrative breaks to provide for preparatory training and flight time.

The Ranger students' desert training begins before they leave the Mountain Phase at Camp Frank D. Merrill at Dahlonega, Georgia. They receive instruction on the desert environment, including its effect on personal health and performance and on equipment, in addition to the first of many hours of instruction on desert tactics, both ours and the Soviets'.

The Ranger students then travel from Camp Merrill to Fort Benning, where they plan and rehearse the initial tactical operations to be conducted later at Fort Bliss. They receive a jumpmaster briefing and sustained airborne training before their departure at about 0100 hours. (As in the past, there are Ranger students who are not airborne qualified. These students are inserted into the desert training phase by alternate means.)

Flying in either C130 Hercules or C141 Starlifters, the Rangers begin their inflight rigging as they cross the Mississippi River heading west. Two and a half hours from Fort Bliss, the Rangers begin the arduous routine of donning their main and reserve parachutes. Each Ranger has on him all the equipment he will use for the six-day period. Just before sunrise, they arrive over Desperation Drop Zone and execute a mass tactical jump. (The drop zone is a dry lake bed in southern New Mexico, just south of White Sands Missile Range.) After assembling, the Ranger students move out to secure objectives south of the DZ and prepare a hasty defense.

The Ranger students then move into a formal instruction period on desert operation and survival, during which they are taught such survival tech-

Rangers in support positions preparing for desert live fire raid.

niques as how to make a water still and conserve water; how to know which plants are edible and which animals and insects are dangerous; and how to maintain their weapons and camouflage their fighting positions. Much of this early training is aimed at teaching them how to live and manage their personal resources so as to remain combat effective in the harsh desert environment.

Immediately after this first instructional period, the Ranger students take part in a cadre-led combat patrol. This initial exposure allows the Ranger students to see desert combat missions executed correctly before they are graded on their own missions. They also develop movement techniques and tactical considerations, such as judging distance (especially at night) and coping with sand and thorny mesquite bushes. The missions include both a vehicle ambush and a raid, which are the primary offensive operations Rangers can expect to conduct in a desert.

On the second morning, the graded phase of the desert training begins. During the next four days the Ranger students participate in continual combat operations against a conventional motorized enemy force. They alternate serving in leadership positions and are graded on how well they do as a platoon leader and as a platoon sergeant.

CLOSE ATTENTION

Because they never know who will be selected next or where in an operation a change will take place, the Ranger students always have to pay close attention to the original concept of the operation, where the unit is, and how each mission is progressing. (This technique, which is used throughout the Ranger course, keeps the students' interest at a high level, even when they are suffering from extreme stress and fatigue.) These missions continue without respite for four days, with a fresh pair of Ranger instructors for each platoon inserted each morning with the new day's mission and water supply.

During one of the four days of combat operations, the Ranger platoons rotate in conducting a live fire raid on a fortified complex. The raid, as a platoon mission, is conducted on a grand scale. The supporting fires include 60mm squad mortars, 40mm grenades fired from M203 grenade launchers, and M60 machinegun fire, while security teams respond to an "enemy" relief column of BMDs with M72 LAWs.

The Ranger students plan and conduct all of the operations with only minimum supervision from the cadre. Safety procedures are observed, of course, but the training does not suffer from oversupervision or over regulation.

The other three days of combat operations are also conducted by the student platoons. During daylight hours the Ranger students occupy patrol bases in dug-in defensive positions under individual camouflage nets. There, the students practice passive defense measures against "enemy" observation from roads, high ground, and aircraft. While in their patrol bases, the Ranger students plan their night's mission, movement, and needed equipment, conduct personal maintenance, and at the same time maintain tight security. That security is often tested by an OPFOR "stroke" any time the Ranger cadre detect a lowering of the security status.

(Throughout the Ranger Course, in fact, the opposing force (OPFOR) is especially aggressive. Sometimes, when the students do poorly in executing an "action at objective," or when security gets a little lax in a patrol base, the OPFOR is quick, hard, and unforgiving. The Rangers get no cheap victories.)

The Ranger students move out just after dark each night and begin their movement to their objective. The movement legs vary in distance, but because of the size of the desert, they are usually extensive. During most combat operations, each platoon conducts two missions per night using raids, ambushes, and reconnaissance patrols. The cycle begins and ends about daybreak as the platoons occupy new patrol bases.

On the sixth day, the students assemble and move to Biggs Army Airfield at Fort Bliss to prepare for their airborne assault into Eglin Air Force Base, Florida, and the beginning of their final phase of training. At the airfield, they conduct sustained airborne training, write and issue operations orders, and check and recheck equipment before they board their aircraft around midnight for their flight to Florida.

PRIDE

Each Ranger graduate can review his desert experiences and training with great pride. For by the time he finishes that phase, he has received expert training and extensive practice in such specialized desert tactics as camouflage, maintenance of weapons, radios, and night vision goggles, as well as in personal maintenance and physical deprivation. He has navigated over extended distances and planned combat missions and supporting fires while fatigued and under great stress. He has also experienced an extremely realistic live fire operation. For six days, the desert terrain, the great distances, the high heat, and the danger of live fire have all offered these Rangers the opportunity to exercise leadership at a high pitch.

So, the next time an old Ranger starts to tell a Ranger School yarn, he'd better have a good one if he wants to top the newer graduate — the "Desert Ranger."

CAPTAIN WILLIAM D. PHILLIPS, a 1975 ROTC graduate of the University of Tennessee, is assigned to the operations staff of the Ranger Department at the Infantry School. He formerly served as an infantry platoon leader and a heavy mortar platoon leader in Germany and as a rifle company commander and battalion S-4 in the 101st Airborne Division (Air Assault).

Israeli MOUT Training

CAPTAIN EDWIN L. KENNEDY, JR.

Combat in built-up areas is not altogether new to the Israeli Army. In 1948 and again in 1967 the city of Jerusalem was a battleground of major significance for the Israeli Defense Force (IDF). Unfortunately, though, the IDF then relegated to secondary importance the tactics and techniques it had learned during those years. Later, during the fighting in Suez City in October 1973, the traumatic losses the Army suffered at the hands of the Egyptians affected its entire approach to MOUT training. As a result, the Israeli Army now conducts realistic and concerted training in MOUT operations at its MOUT training facility in the Negev Desert.

Israeli Army units regularly rotate through this facility, which is divided into two separate villages, one on a slight rise and the other on low ground. The buildings are of concrete block construction, which makes it easier to repair or replace damaged or destroyed portions.

The facility contains a variety of buildings with different interiors — one, two, or three stories, some with open court rooms, others with balconies, railings, staircases, and a variety of room arrangements.

The inside of each room is lined with a bullet-absorbent wall, which permits the firing of weapons in each room without fear of ricochet or damage to the concrete block. These liners are replaced in sections, as needed. Normally, to extend the life of the liners, only weapons of 5.56mm are fired inside; 7.62mm weapons can be fired into the walls but with a corresponding decrease in the life of the liners.

The training the Israelis conduct in this facility is extremely detailed at the small unit and individual level, because these are the levels at which urban combat normally occurs. All of the soldiers are taught individual techniques for such combat, including procedures for carrying weapons, methods of moving outside of and into buildings, methods of entering openings, and techniques for firing weapons. These techniques are standard throughout the Army, and the trainers are the leaders of the units being trained.

BATTLE DRILLS

After the soldiers master these individual techniques, they are organized into assault teams to practice simple battle drills. This training is initially done "dry" with emphasis on both speed and precision. When mistakes are noted, immediate corrections are made.

When the squads and teams are proficient in their techniques, the platoons begin conducting exercises that include maneuvering into the complex. Finally, when everyone has been rehearsed, the soldier's weapons are loaded (IDF soldiers always carry their ammunition), and the units are given orders to attack the villages.

All organic platoon weapons are used, and plenty of targets are provided for both the suppression and the assault elements. Armored vehicle hulks and fuel drums are placed randomly around the facility to simulate the enemy, and subcaliber RPG training rounds are used against the vehicles and the outside walls of the buildings.

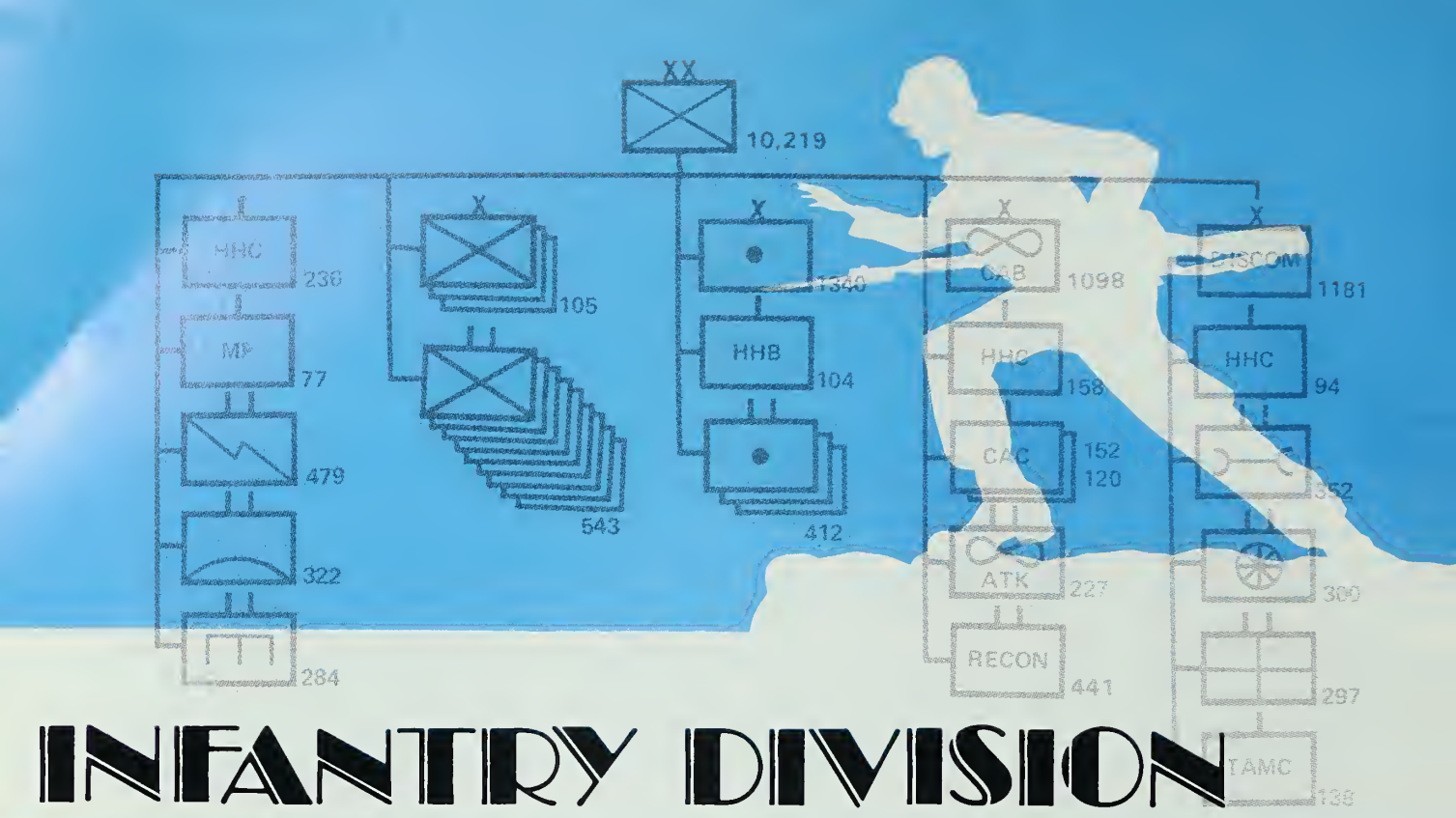
The attack on the villages, which takes place at combat speed, gives the troops an idea of what it is like to have live rounds being fired next to, over, and around them. As with all other training exercises, unit leaders act as safety officers while they lead their units through the exercise.

When the attack is completed, the unit members gather for a critique. If time permits, the units repeat the exercise until they perform it correctly. In this manner, the units build teamwork and instill confidence in their men.

One of the problems in conducting such a live fire exercise is the safety of the soldiers. Because the fighting is so decentralized, it is difficult, for example, to keep troops from entering through two different doorways into the same room and shooting at each other. Also, it is absolutely necessary for all soldiers to wear earplugs. The sound of live ammunition being fired inside a room is markedly different from the sound of blanks, and soldiers who fail to take this precaution suffer accordingly.

The Israelis, in building and using the MOUT training facility, have shown that they clearly understand the difficulties and the threats an attack on a built-up area poses. And the IDF's treatment of Beirut, with extensive air and artillery attacks, underscores this understanding. Certainly, the units of the IDF are much better prepared to conduct battles in such areas, if they must, after training in their live fire facility.

CAPTAIN EDWIN L. KENNEDY, JR., a 1976 graduate of the U.S. Military Academy, is an ROTC instructor at Texas A and M University. He attended the Israeli Armor Corps Commander's Course in 1981.



INFANTRY DIVISION (Light)

This article has been compiled from information supplied by various departments of the Infantry School and by the Combined Arms Combat Development Activity at Fort Leavenworth, Kansas.

The Infantry Division (Light) is a compact force of some 10,000 soldiers. It is a strategically deployable force that will focus on defeating light enemy forces in low-intensity conflicts, but at the same time it is capable of being employed in mid-intensity conflicts when it is augmented by additional combat support and combat service support units. (See Major General James J. Lindsay's Commandant's Note, INFANTRY, January-February 1984, pages 2-3.)

Its organic infantry units, which are footmobile, are characterized by their ability to operate on a decentralized basis on close terrain against other light infantry forces. Their hallmarks are speed, agility, initiative, and physical lightness. They will be trained to be iron-willed fighting units that are fully proficient in small unit operations, night fighting, marksmanship skills, and conventional infantry tactics.

The division's close combat maneuver force is the light infantry battalion. This unit can conduct the full range of offensive actions against opposing light forces in all types of terrain. But because it has only a limited number of antiarmor weapon systems and no organic tactical mobility, the battalion must be augmented to fight effectively against enemy armor. When it is not augmented, it should be employed in close terrain (built-up areas, forests, mountainous terrain) when taking on enemy armored forces.

The focus of the battalion, however, is on defeating light enemy forces in a low-intensity setting, and it has a large number of night observation devices and weapon sights to improve its soldiers' ability to fight under limited visibility conditions.

The battalion can participate in a deep attack as part of a larger force if it is augmented with aviation or other mobility assets. Its ability to conduct movements to contact or hasty deliberate attacks is essentially the same as that of other light infantry forces, but unless the battalion is augmented, such activities will be footmobile.

The battalion can pursue opposing footmobile light forces and, if provided with mobility assets, can effectively move about the battlefield to exploit situations. It is also able to conduct such special purpose missions as reconnaissances in force, raids, ambushes, feints, and demonstrations.

In short, the battalion is well suited for offensive operations that are manpower intensive rather than system intensive, because its ratio of fighters to supporters is very high.

The battalion is best suited to defend against light forces, although it can defend against tank and motorized forces in close terrain when it is augmented with antiarmor weapons. It is capable of combining static and dynamic elements of defense but is better suited for the static unless given mobility assets.

The battalion defends to hold terrain or to protect key installations and facilities, and it can conduct economy of force missions. Because of its limited organic transportation assets, the battalion is not ideally suited to conduct delaying actions against opposing forces other than light ones. With proper augmentation and in close terrain, though, it can delay against heavy enemy forces as well. Regardless of the opposition, its engagement ranges in the delay will be close, since the battalion does not have many long-range weapon systems.

ORGANIZATION

The light infantry battalion consists of a headquarters and headquarters company and three rifle companies (see Figure 1). It has a "from the gound up" structure that is

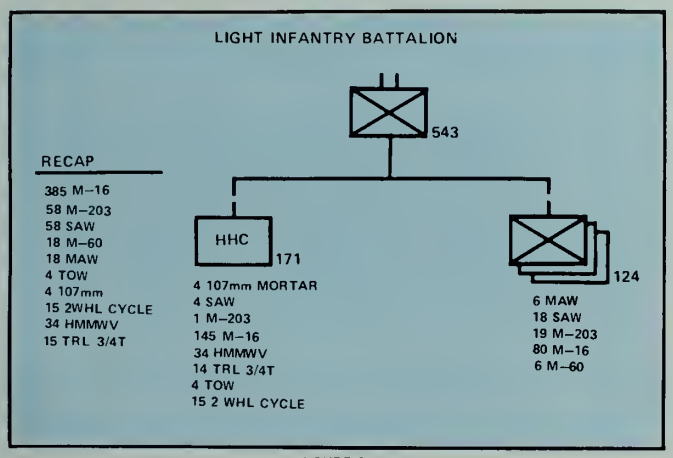


FIGURE 1

designed to meet the requirements of a low-intensity battlefield. It is very light and can be moved easily in U.S. Air Force aircraft. Additionally, all of the battalion's assets can be moved by UH-60 helicopters.

Although the battalion has a limited number of antiarmor and indirect fire weapon systems, it can readily accept augmenting systems. And it does have a large number of automatic weapons and the type of communications equipment it needs to operate in low-intensity settings.

The battalion has exceptionally austere combat service support assets and relies on its brigade for mess and maintenance support. While it can operate for 48 hours without resupply, it can operate indefinitely if it is provided with additional logistical support. It has only two types of vehicles — the High Mobility Multi-purpose Wheeled Vehicle (HMMWV) and the motorcycle.

The organization of the battalion's headquarters and headquarters company is shown in Figure 2. The com-

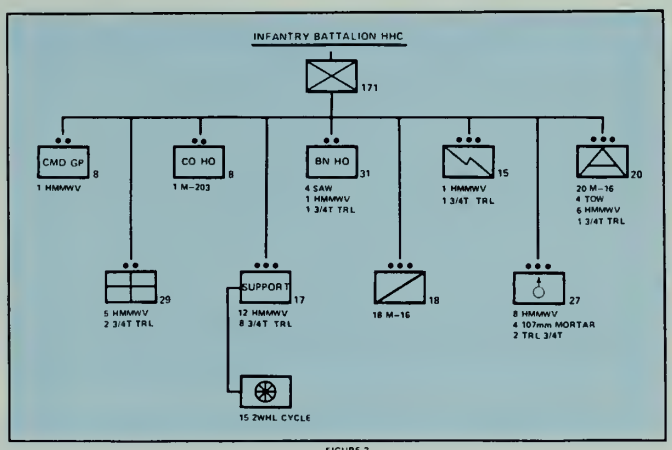


FIGURE 2

mand group, headquarters section, company headquarters, and communications platoon are similar to those same elements in other light forces.

The medical platoon is larger than one normally found at battalion level and provides the company aidmen as well as the battalion aid station. A surgeon is organic to the battalion, and the structure of the platoon is such that medical support is provided well forward in the battle area. The medical platoon supports the battalion and any other organizations located in the battalion's area of operations.

The support platoon contains vehicles and motorcycles that can provide transportation assets to the battalion's units as they are needed. The 15 motorcycles, for example, are available for liaison activities, for messengers, and for reconnaissance purposes.

The reconnaissance platoon is footmobile and lightly armed. It is capable of performing close-in reconnaissance and limited security and can get some mobility through the use of the support platoon's motorcycles.

The antiarmor platoon has four TOW launchers, which give the battalion a limited heavy antiarmor direct fire capability. It can operate in split sections to provide continuous overwatch while moving. When the battalion is employed in areas where there is no enemy armor threat, the platoon can be used as an additional reconnaissance unit.

The heavy mortar platoon has the battalion's only organic indirect fire assets — four 107mm mortars. This platoon, like the antiarmor platoon, can operate in split sections to provide continuous fire support while moving.

RIFLE COMPANY

The rifle company is organized as shown in Figure 3. It has no organic vehicles. The companies may use the support platoon's motorcycles for various purposes.

When the company is in an area where there is no enemy armor threat, its light antiarmor section can be used as an additional rifle unit. The medium antiarmor

weapons have been consolidated at company level to improve training, to ensure rapid response to the company commander, and to preclude encumbering the rifle pla-

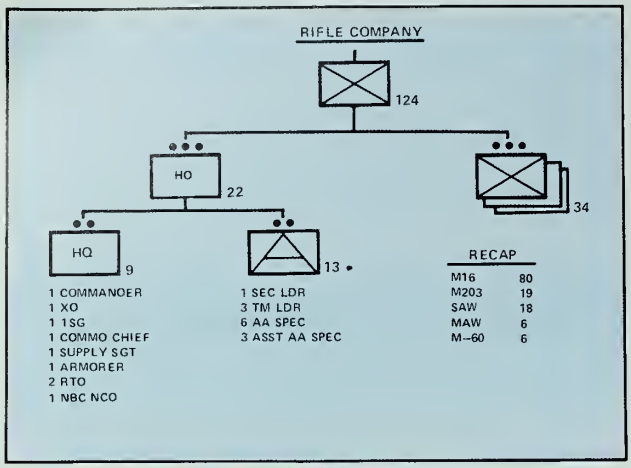


FIGURE 3

toons with a bulky weapon system that might impede their rate of movement.

All of the individual weapons allocated to the company use one caliber of ammunition — 5.56mm. Members of the rifle platoons are equipped with night vision sights, as are certain key personnel in the company headquarters and antiarmor sections. The rifle company, therefore, is capable of conducting operations under most conditions of limited visibility.

The simplicity of the design of the rifle platoon is intended to match the experience level of the platoon leader (see Figure 4). The two M60 machineguns are placed,

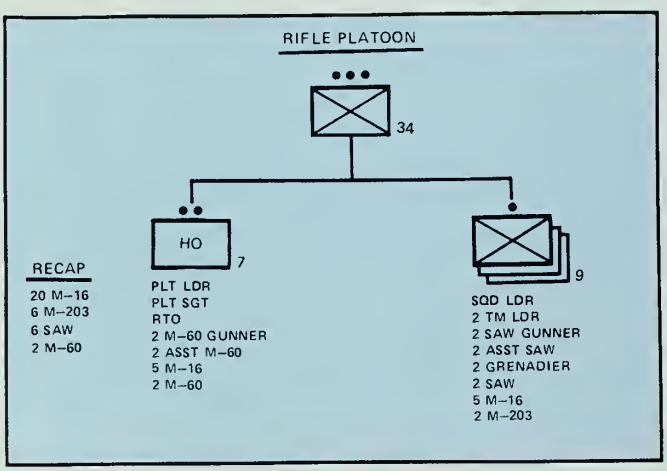


FIGURE 4

controlled, and displaced by the platoon leader. (These weapons may be replaced in the future by four SAWs, depending on the outcome of an analysis that is now comparing the two systems.)

The three rifle squads in each platoon contain nine men each (see Figure 5). They operate in two fire teams, with each team consisting of four men. The squad leader and team leaders lead by example in a "go where I go, shoot where I shoot" mode of operation.

RIFLE SQUAD

1.	SQUAD LEADER	M–16
2.	TEAM LEADER	M–16
3.	AUTOMATIC RIFLEMAN	SAW
4.	RIFLEMAN	M–16
5.	GRENADIER	M–203
6.	TEAM LEADER	M–16
7.	AUTOMATIC RIFLEMAN	SAW
8.	RIFLEMAN/MARKSMAN	M–16
9.	GRENADIER	M–203

FIGURE 5

As General Lindsay said in his Commandant's Note, the infantry battalions "can look for immediate battlefield support from a division artillery composed of three 105mm howitzer battalions with 18 howitzers each; an aviation brigade that has 36 Black Hawks, 29 attack helicopters, and 31 scout helicopters, as well as a military intelligence/reconnaissance unit; an air defense battalion equipped with 18 improved Vulcans and 40 Stinger teams; and a light combat engineer battalion."

In addition, all of the major elements found in our current divisions are retained in the Infantry Division (Light), although at reduced strengths comparable to the smaller infantry battalions. Thus, the engineer battalion has only 284 soldiers and a minimum amount of equipment.

With less equipment and personnel to support, the division support command is very austere with 1,181 soldiers. The FASCO concept has been retained, and some battalion functions such as maintenance and mess have been consolidated at brigade level. And although the maneuver battalions have organic medical structures, the remainder of the division will operate under an area support concept.

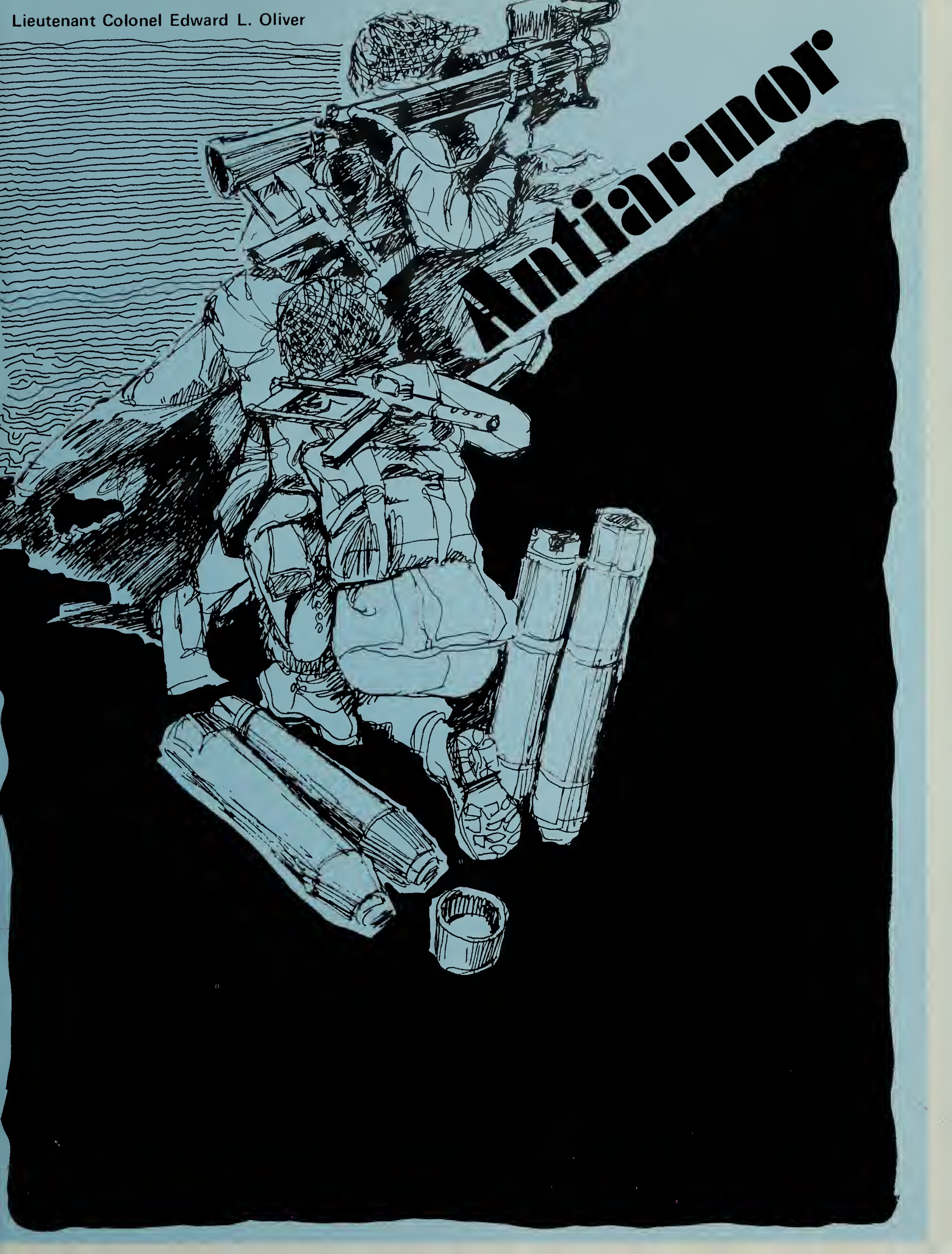
The division artillery is also austere. It has no general support capability, and has reduced support and ammunition haul capabilities. But its basic fire support structure — FSEs and FIST — has been retained.

Even though the Infantry Division (Light) is austere, with the right corps and echelons above corps structures behind it, it allows the Army to meet many goals. Its force structure better matches the Army manpower that Congress has allocated; it is a strategically deployable force; it provides a more credible fighting capability that can react rapidly to the National Command Authority's requirements; and its structure retains all of the critical elements and command structures needed for it to be augmented, if necessary, for any conflict to which it might be committed.

All that remains now is to field infantry divisions with the new structure and to train our soldiers to fight effectively within them.

Lieutenant Colonel Edward L. Oliver

Antiarmor



The following account by an Israeli tank commander in the Sinai in 1973 describes the effects a coordinated antitank defense can have:

We were advancing and in the distance I saw specks dotted on the sand dunes. I couldn't make out what they were. As we got closer, I thought they looked like tree stumps. They were motionless and scattered across the terrain ahead of us. I got on the intercom and asked the tanks ahead what they made of it. One of my tank commanders radioed back: "My God, they're not tree stumps. They're men!" For a moment I couldn't understand. What were men doing standing out there — quite still — when we were advancing in our tanks toward them? Suddenly all hell broke loose. A barrage of missiles was being fired at us. Many of our tanks were hit. We had never come up against anything like this before . . .

The Egyptians had lured an Israeli armor battalion into an antiarmor ambush zone consisting of camouflaged, entrenched infantrymen armed with RPG-7 light antitank rockets and Sagger antitank guided missiles (ATGM). The Egyptians, coordinating their fires, had caught the Israeli tanks in the kill zone of both weapons at the same time and the combined effect was devastating. More than 35 Israeli tanks were destroyed, and the battalion commander was captured.

Recent Middle East fighting reaffirms the offensive potential of and the need for combined arms teams. It also continues to demonstrate the lethality of modern antitank rockets and antitank guided missiles against infantry fighting vehicles and the latest main battle tanks. Throughout the world, countries are lavishly equipped with the latest antitank rockets and ATGMs. A U.S. Army unit that deploys today, therefore, must be prepared, as the British recently experienced in the Falklands, to face many of these weapon systems. Accordingly, the capabilities of these weapon systems should be indelibly engraved in the minds of each of our battle captains, platoon leaders, and squad leaders. (While there are numerous antiarmor systems, this article, for brevity's sake, discusses only the latest and most significant ones.)

Most infantry antitank weapons fit into three general categories: heavy, medium, and light, and they are commonly referred to as HAW, MAW, and LAW.

HAWs are long-range systems that can engage targets beyond 2,000 meters. Their purpose is to destroy as many tanks as possible and break up the momentum of an enemy armored force before that force gets close enough for its direct fire weapons to affect the friendly forces. Most HAWs require a vehicle for transportation and employment and a crew for operation. They are usually centrally controlled at the battalion or brigade level.

MAWs, usually found at the company or platoon level, have a range of from 1,000 to 2,000 meters. Most of them are manportable (by one man or by a crew) and can be integrated as part of a combat vehicle's firepower. Their purpose is to maintain a high concentration of fire in an antiarmor kill zone while the HAWs displace to alternate firing positions out of direct fire range.

The majority of today's HAWs and MAWs are ATGMs that carry the large, high-explosive, antitank (HEAT) warheads needed to destroy or disable modern main battle tanks. HEAT warheads use the shaped charge principle to "explode" a hyper-velocity metallic jet through a tank's armor to produce spalling and ricocheting fragments inside to kill crew members, damage instrumentation, and cause secondary fuel fires and ammunition explosions. ATGMs generally can be classified by their guidance concepts: manual, semiautomatic, or automatic.

A manual command-to-line-of-sight (MCLOS) ATGM system usually requires its gunner to track both his target and his missile visually while manually making missile flight corrections by moving a joystick, an operation similar to flying a model airplane. An MCLOS is sometimes referred to as "first generation" guidance and is typical of the ATGMs that appeared in the mid-1950s. Systems using this type of guidance are now considered obsolete. To make manual guidance possible, the missile velocity had to be slowed, and this resulted in a long time of flight. Additionally, the MCLOS gunners required an excessive amount of training to "fly the missile."

To overcome these deficiencies, semiautomatic command-to-line-of-sight (SACLOS) systems were developed. A SACLOS requires its gunner to track only the target. The missile is "tied" to the gunner's line of sight by an electro-optical guidance set that "watches" a signal — usually an infrared light (IR) source — from the missile. The guidance set detects missile variations from the line of sight and then computes and sends the required corrections by wire or radio to the missile. This type of system is often referred to as "second generation" and is found in most of the ATGMs fielded today. The SACLOS systems greatly reduce gunner training requirements and allow faster missiles to be used. The gunner, however, still has to track a target throughout the flight of his missile and remains vulnerable to suppressive fires.

Future ATGMs may use automatic guidance, which will not require a gunner to track either his missile or his target. The missile will home in on the target automatically. An automatic guidance system is often referred to as "fire and forget" or "third generation." While there are no systems of this type in the field today, the development of a "third generation" missile is under way in many countries.

The "bayonet" of the antiarmor battle is the LAW, which many call a final protective, self-defense, or last-ditch weapon. The LAW, an integral part of the close-in battle (300 to 500 meters), gives the infantryman a significant antiarmor role in such restricted terrain as woods and urban areas. LAWs are usually light, manportable weapons that are cheap to manufacture and simple enough to be spread throughout the battle area; they are also effective against such secondary targets as bunkers,

field fortifications, and light-skinned vehicles.

Today's LAWs are direct descendants of the World War II U.S. bazooka and the equally successful German *Panzerfaust* 150. They can be generally classified by their propulsion principles: rocket, recoilless rifle, and Davis gun.

The rocket principle, used with the U.S. LAW M72A3, for example, is the one most widely used today. The propellant is burned within the rocket before it leaves the tube. Because no initial pressure demands are made on the launch tube, it can be constructed simply with lightweight materials. This rocket principle does have the disadvantages of a large signature from smoke, blast, flash, and dust, and limited accuracy at ranges beyond 300 meters.

Recoilless rifles, such as the Carl Gustaf, are breech-loaded and have venturi tubes, or openings, in the breech-lock to "balance" the rearward thrust of the rocket. As a result, high internal pressures are placed on the tube. Consequently, because LAWs operating on this principle must be strong enough to withstand these high pressures, they are usually heavy and are not disposable. They also have large forward and backblast firing signatures, and their large backblast danger areas restrict their employment in confined areas.

The Davis gun principle, which the *Panzerfaust* 3 uses, requires a countermass from the rear of the tube equal to the mass of the rocket fired from the front of the tube, which provides a recoilless effect. These weapons weigh more than most LAWs. Their principal advantage is a smaller flash, blast, and smoke signature. A modification of this principle uses gases generated in the center of the launcher acting on two pistons. These pistons send the projectile out one end and a countermass out the other and then form seals at both ends of the tube. There is no launch signature (smoke or blast). This principle provides a solution for firing from an enclosed room or bunker.

LIGHT ANTITANK WEAPONS

M72A3 LAW

The U.S. Army's M72 LAW was fielded more than 20 years ago as a longer range and more effective replacement for the 3.5-inch bazooka. It is an individual antitank weapon and is issued as a round of ammunition. The M72 series, now out of production, weighs about five pounds and can be carried by one man. A self-contained disposable weapon, it consists of a rocket within a telescopic launch tube and an integrated sight. Its effective range is about 200 meters and its 66mm warhead can penetrate about 300mm of rolled homogeneous armor (RHA).

RPG-7

A direct descendant of the World War II German *Panzerfaust* 150, the RPG-7 is the standard manportable antitank weapon used by the Soviet Union and its allies.

RPG-7

There are two models: the RPG-7V, issued to motorized infantry squads, and the RPG-7D, a break-apart version, issued to airborne infantry squads. Its rocket-assisted projectile is a unique feature that reduces the initial backblast and protects the gunner. Since it weighs about 22 pounds, the RPG-7 can be loaded and fired by one man, but is usually served by a two-man crew. Its effective range is 300 meters, and its warhead is capable of penetrating 330mm of RHA. In addition to iron and optical sights, active IR and passive starlight night sights are also available. Since the RPG-7's introduction in 1962, it has been used in many areas of the world.

RPG-16

The RPG-16 has recently been identified in the Soviet's manportable antitank inventory. When ready to fire, it weighs about 29 pounds and has a crew of two — a gunner and an ammunition bearer. Estimates are that its warhead can penetrate up to 375mm of RHA. Resembling a large RPG-7, it has optical sights, a trigger grip below the tube, and a conical blast shield on the rear of the tube. It has a bipod mounted on the front of the tube, which may indicate it has a heavier and more effective warhead than the RPG-7.

RPG-18

Another new addition to the Soviet Union's LAW inventory is the RPG-18. A disposable system consisting of a 64mm rocket loaded in a telescopic tube launcher, the RPG-18 weighs 9 pounds. The rocket is spin-stabilized, and its HEAT warhead can penetrate up to 375mm of RHA. The RPG-18 bears a remarkable resemblance to the U.S. M72A3 LAW, to include having its operating instructions on the side of the tube. Like the M72A3, it appears to be designed as a simple-to-operate antiarmor weapon to be used at all levels. A version of the RPG-18, the RPG-75, is manufactured in other Warsaw Pact countries.

LAW 80

The British LAW 80 is a platoon and small unit, manportable, one-shot, disposable antitank rocket. It is issued as a certified round of ammunition and weighs

about 21 pounds. The LAW 80's 94mm HEAT warhead is capable of penetrating more than 600mm of RHA. A unique feature of the LAW 80 is a five-round spotting rifle as a part of the launcher. This addition is supposed to increase the LAW 80's hit probability at an effective range of 500 meters.

Panzerfaust 3

The Federal Republic of Germany's (FRG) *Panzerfaust* 3 operates according to the Davis gun principle

Panzerfaust 3

(countermass) and can be fired from closed rooms, bunkers, and other shelters. When ready to fire, it weighs about 26 pounds and has an effective range of about 400 meters. Its 110mm HEAT warhead is said to be able to penetrate more than 600mm of RHA. The weapon is designed as a two-piece system. A launcher and rocket form the cartridge to which a firing mechanism with a sight is attached. After firing, the gunner throws away the launcher. The firing mechanism with the sighting unit is reusable.

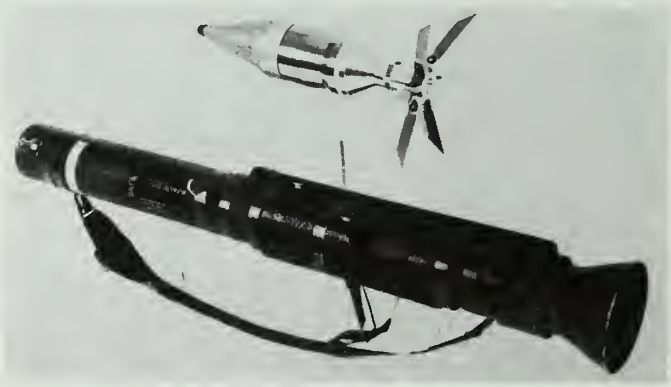
Armbrust

Another FRG manportable, expendable system is the *Armbrust*. It has an effective range of 300 meters and is issued as a round of ammunition that weighs about 14 pounds. Its 67mm warhead is capable of penetrating more than 300mm of RHA. The *Armbrust's* double-trapped piston design propels the projectile out the front and at the same time drives a "countermass" of 5,000 small plastic chips to the rear to balance the forward movement. As a result, *Armbrust* has no flash, smoke, blast, or recoil and has a noise signature that is similar to a pistol's. It can be fired safely from small enclosed rooms.

Armbrust

AT-4

The Swedish 84mm AT-4 is a lightweight, expendable, antiarmor system with an effective range of 300 meters. The AT-4 weighs about 13 pounds and consists of a lightweight, fiberglass launcher tube, front and rear battle sights, a firing mechanism, and a projectile. In addition to its armor penetration, which exceeds 300mm of RHA, its 84mm warhead has been improved for such behind-



Swedish AT-4 LAW

the-armor effects as overpressure inside the vehicle, blinding and incendiary effects, and mechanical damage to vital components by fragments.

FFV 550 Carl Gustaf

The Swedish Carl Gustaf is an 84mm recoilless rifle. It consists of a rifled tube and is breech-loaded. An open sight is available, and a telescopic or IR night sight can be mounted. The Carl Gustaf weighs about 40 pounds and

Carl Gustaf

requires a crew of two. Its HEAT round has an effective range of about 700 meters and can penetrate more than 400mm of RHA. An electro-optical telescopic sight is available with a coincidence rangefinder and an electronic lead finder. The Carl Gustaf also fires an antipersonnel round, a smoke round, and an illumination round.

AC300 Jupiter

The French *Jupiter* is a 24-pound, throwaway antitank weapon. The launcher is 70mm in diameter with a 115mm front portion that houses an oversized warhead. A probe

Jupiter

is collapsed inside the 115mm warhead for carrying purposes, and it must be extended when the weapon is prepared for firing. This 100mm probe, much like the probe on the improved U.S. TOW, increases the detonation standoff distance and contributes to the *Jupiter's* 700mm RHA penetration capability.

The disposable launch tube mounts a reversible 3-power day or night sight. Employing the countermass principle, it ejects a fin-stabilized rocket from the launcher tube, which then fires to attain its maximum velocity. *Jupiter* has an effective range of 330 meters and has neither a smoke nor a flash signature. Its noise signature is like that of a pistol, and like the *Armbrust,* it can be fired from small enclosed spaces.

Strim

The French 89mm rocket launcher, *Strim,* when loaded and ready to fire, weighs 19 pounds and has a range of 315 meters. Its fin-stabilized HEAT rocket warhead is capable of penetrating more than 400mm of RHA. *Strim* also fires smoke, illumination, and antipersonnel/antivehicle rounds.

Strim

Two components make up the total system: a rocket in a carrying tube and a forward launcher section with a tube that mounts an adjustable shoulder piece and foregrip, a firing mechanism, and a telescopic sight. An image intensification night sight can be used in place of the telescopic sight.

APILAS

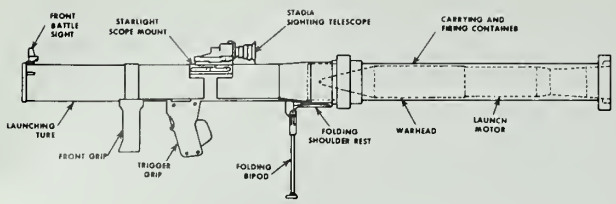
The French APILAS (armor-piercing infantry light armor system) in the carry mode is 50 inches long. The launcher tube, made of lightweight Kevlar and special plastics, and the projectile together weigh about 20 pounds. APILAS can be fired by either a right- or left-handed gunner by altering the position of the sight, hand-

APILAS

grip, and shoulder pad on the launch tube. APILAS has an effective range of 330 meters when fired from the shoulder and can penetrate more than 720mm of RHA. With the addition of an 18-round firing aid (tripod and computerized optical sight), the effective range is almost doubled to 600 meters.

B-300

The Israeli 82mm B-300 is a manportable, shoulder-fired system with an effective range of 400 meters. The B-300 is similar to the French *Strim.* It also uses a two-part launcher consisting of a reusable forward section capable of mounting a telescopic or starlight sight and a rocket in an expendable transport container that attaches to the forward section to form a complete launcher. The B-300,



B-300

loaded and ready to fire, weighs 18 pounds, and its HEAT warhead is capable of penetrating 400mm of RHA. There may be other projectiles available: one with an incendiary warhead and one with a follow-through warhead for use in urban areas or for bunker-busting. The B-300 is being evaluated by the U.S. Marine Corps as a shoulder-launched multipurpose assault weapon (SMAW).

M72-750 Norwegian LAW

Norway, the only producer of the M72 LAW outside the U.S., has developed an improved version called the M72-750 because of its muzzle velocity of 750 feet per second. A round ready to fire weighs about seven pounds (two more than the M72A3), has increased penetration, estimated at 380mm of RHA, and increased hit probability. These improvements are the result of an upgraded rocket motor and a new fixed probe warhead to increase the detonation standoff distance. Other improvements include a sighting system similar to the one developed for the U.S. Viper and a better "feel" to the trigger mechanism so that the gunner can better judge the moment of firing.

MEDIUM ANTITANK WEAPONS

M-47 Dragon

Fielded in 1975, the Dragon is the U.S. Army's manportable medium ATGM. It has a range of 1,000 meters and is a SACLOS system. It was the first manportable guided missile system capable of destroying tanks and other armored vehicles within a platoon's area of operations. The missile and launcher weigh about 32 pounds.

The Dragon consists of three major items: a round that consists of a missile preloaded into a sealed expendable launch tube that has a forward bipod attached to it; a tracker that is easily attached and removed from the round; and a thermal-imaging night sight that enables the Dragon to be used without artificial illumination. Dragon is used by many nations, a third of which are in the Middle East.

MILAN

MILAN (missile, infantry light antiarmor) is a SACLOS medium antitank system fielded in 1972 by France and the FRG. It was designed to be used by airborne, mountain, and dismounted infantry units at the platoon and company levels. MILAN has a range of 2,000 meters, and its velocity — about twice that of the earlier ATGMs — enables it to reach its maximum range in 12.4 seconds. It requires a crew of two: an operator, who carries the firing unit, and a loader, who carries two missile rounds.

The firing unit has a sighting and guidance assembly mounted on a tripod, and each missile round has a launch tube and is handled as a round of ammunition. MILAN also has a thermal-imaging night sight that is capable of detecting targets at three kilometers. It is used by over 23 countries, including several in the Middle East and the People's Republic of China.

MILAN with night sight

AT-4 Spigot

The Spigot is the Soviet's first medium ATGM using SACLOS guidance and is believed to have been fielded sometime around 1978. It bears a remarkable resemblance to the MILAN and almost certainly uses the same principles. It has a range of 2,000 meters, is believed to penetrate about 500mm of RHA, and is employed with a tripod, which gives its gunner a low silhouette. This last characteristic — coupled with its high velocity (185-200 meters per second) and its short time of flight (11 seconds) — increases its survivability as well as that of its crew. Spigot is used by Soviet units in Easy Germany and in other Warsaw Pact armies. According to newspaper accounts concerning Israeli operations against Syria, it also appears that the Spigot is exported to the Middle East.

HEAVY ANTITANK WEAPONS

TOW

The TOW (tube-launched, optically tracked, wire-guided) is the U.S. Army's company- and battalion-level heavy antitank/assault SACLOS guided missile weapon system. It is a portable system capable of being operated from the ground; from armored, light armored, or unarmored multipurpose vehicles; and from helicopters.

The "basic" TOW, fielded in 1970, has a range of 3,000 meters. In 1979, a program was begun to improve its capabilites, particularly against the evolving Soviet armor threat. An improved TOW (ITOW) missile with an improved five-inch warhead and an extendable standoff probe was fielded in 1981. This gave the weapon an increased armor penetration capability.

The TOW-2, which has a full-caliber six-inch warhead with probe, will be fielded in the near future. TOW-2

TOW with AN/TAS-4A night sight

provides further increases in penetration and range — out to 3,750 meters. The system can operate under all battlefield conditions provided the gunner can "see" his target through his optical or thermal-imaging night sights. TOW is used by eleven NATO nations and more than 40 other countries. It can be found in large numbers in the Middle East. Recent combat experiences in that area have demonstrated TOW's adaptability to hit-and-run tactics from ground, vehicle, or helicopter roles.

HOT

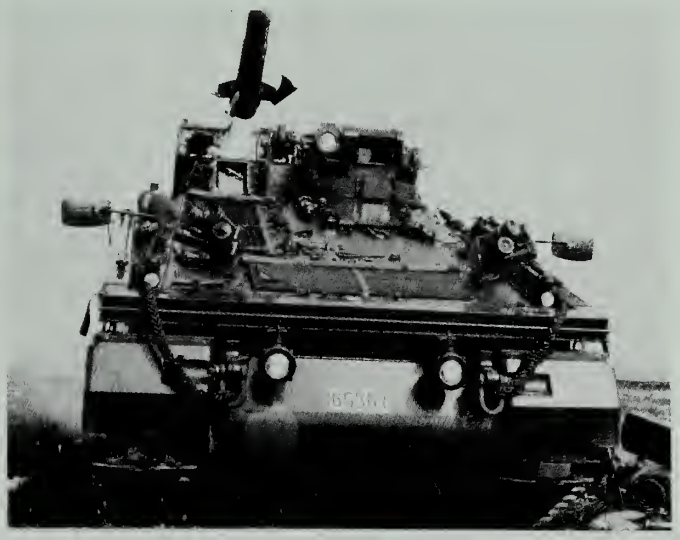
HOT (high-subsonic optically teleguided) was developed jointly by France and West Germany as a heavy SACLOS antitank system. Fielded in 1978, HOT permits the engagement of all main battle tanks known today from a variety of light armored vehicles and helicopters. HOT has a range of 4,000 meters, and its penetration is estimated to be more than 800mm of RHA. HOT's high velocity of 240 meters per second results in a time of flight of 17 seconds to its maximum range. HOT has been selected for use by over 13 countries, about half of them in the Middle East.

HOT on Jaguar 1

Swingfire

The United Kingdom's Swingfire has been in service since 1969. It is a first-generation MCLOS ATGM. Control is usually from a launch vehicle. The infantry variant known as Beeswing can be fired from launchers mounted on a Land Rover or can be dismounted and fired from the ground.

A unique feature that gives Swingfire a degree of tactical flexibility not found in the SACLOS systems is its ability to be fired with the launcher concealed behind cover and without an optical line-of-sight to the target.



Swingfire on Striker

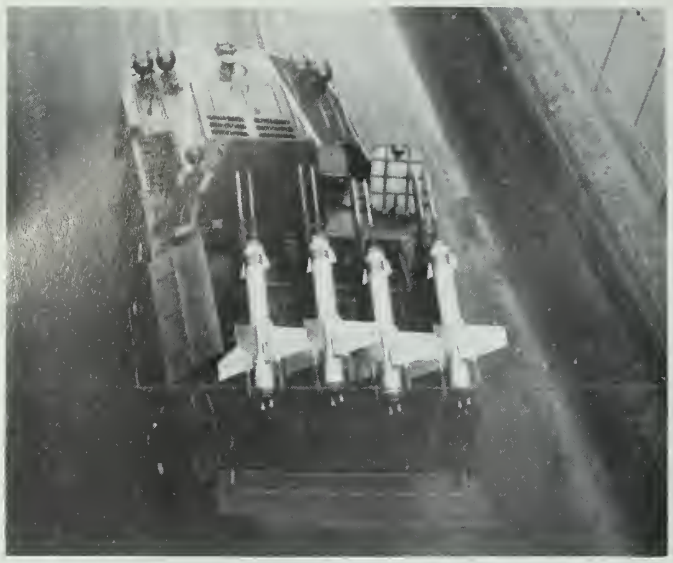
The gunner, for example, can be up to 100 meters from the launcher and the missile is automatically gathered into his field of view. Because it is manually controlled, its hit probability is lower than that of SACLOS systems. Swingfire is mounted on a variety of vehicles and helicopters. Three other countries besides the United Kingdom use this system.

Snapper

The Snapper was introduced by the Soviets in the early 1960s. It is a first-generation MCLOS system now considered obsolete by the Soviets. It has been replaced in the Soviet force structure by other systems.

AT-2 Swatter

The Swatter is a long-range — 3,500 meter — system and was apparently designed by the Soviets specifically to be mounted on armored reconnaissance-type vehicles. It can also be found on a variety of other vehicles. Swatter



Swatter

has been made in three versions: the AT-2A, AT-2B, and AT-2C. The AT-2A and AT-2B are first-generation MCLOS (radio controlled by joystick) systems that have a range of 2,500 and 3,500 meters, respectively. Both have a relatively low hit probability — less than 70 percent — and an armor penetration of an estimated 500mm of RHA. The AT-2C system is a product-improved second generation SACLOS system used apparently only on helicopters. Swatter is used throughout the Warsaw Pact and by several Middle Eastern countries.

AT-3 Sagger

There are two versions of the Soviet Sagger: the AT-3, first generation MCLOS system that has been in service for approximately 18 years, and the AT-3C, which incorporates a second-generation SACLOS product improvement. The result of the product improvement is an increase in its hit probability from 60 percent for the AT-3 to over 90 percent for the AT-3C. The AT-3 is a three-man, crew-served weapon, while the AT-3C is a vehicle and helicopter system. Both have a range of 3,000 meters and a time of flight of about 25 seconds. Sagger can penetrate an estimated 400mm of RHA. This system has seen extensive service in the Middle East and in Vietnam.

AT-5 Spandral

The Soviet Spandral was first seen in 1977. It appears to be a SACLOS system and the replacement for both the Swatter and the Sagger. It is similar to the TOW and the HOT in range and use. It has an estimated penetration of 500-600mm of RHA and a range of 4,000 meters. Spandral is mounted on the BRDM-2. There are also indications of a night sight. A large, wide-angle periscope seems to be mounted on the BRDM-2 so that the gunner can acquire and engage targets from a buttoned-up position.

AT-6 Spiral

The Spiral, the latest Soviet antitank missile, appears to have been developed for helicopter use. It is believed to have a higher velocity than other currently fielded ATGM systems. It is described as a large, powerful missile, which appears to indicate that the Soviets believe only a large warhead will be effective against the improved armor of the latest generation of main battle tanks.

COUNTERMEASURES

Antitank weapons depend on a gunner's ability to acquire a target, estimate its range and speed, obtain a sight picture, hold a steady aim until he can get a shot off, and, in the case of an ATGM, maintain his guidance and link with the missile until it hits the target. Any means of killing or disrupting the gunner — denying his visual contact, subjecting him to suppressing fires, or disrupting his link with the missile — negates his effectiveness.

The weapon mix of the combined arms team provides the most effective way to attack or suppress an antitank gunner. When infantry and armor are cross-attached, the direct fires of their various weapon systems, along with artillery and mortar indirect fires, can be brought to bear on antiarmor positions. But a good combat leader will always remember that LAWs, MAWs, and HAWs are usually placed in depth, and he should plan for this. His reconnaissances and map studies should identify likely LAW, ATGM positions and possible kill zones, and these and any discovered positions should be targets for supporting indirect fires and smoke.

Our doctrine calls for the combined arms team to undertake offensive operations to control the combat zone. A well-planned antiarmor defense can be devastating to a unit that is caught by surprise and that violates combined arms principles.

At the National Training Center in California, many of our task forces have found it difficult to maneuver and defend against the OPFOR. One of the reasons for this difficulty is the inability of the U.S. battalions to counter the OPFOR's heavy antitank missile opposition.

If our commanders know the capabilities and vulnerabilities of the various antiarmor systems they may have to face, and if they train their units to defeat those systems, they will tremendously improve their chances of surviving and winning on any future battlefield.

LIEUTENANT COLONEL EDWARD L. OLIVER, an ROTC graduate of the Citadel, also holds a master's degree from Clemson University and has completed the Defense Systems Management College. He has commanded Infantry, airborne, and mechanized Infantry companies and has served with the Infantry Board and the Combined Arms Combat Development Activity. He is presently assigned as DA System Coordinator for TOW, Dragon, and Rattler in the Office of the Deputy Chief of Staff for Research, Development, and Acquisition.

Land Navigation

A COMMON TASK, NOT COMMONLY UNDERSTOOD

Noel J. Hotchkiss

Land navigation skills are among the few that just about everybody in the Army — at every level of command and leadership — needs to learn and practice to a high standard of competency: The vast majority of the Army's personnel, whether their duties are in combat, combat support, or combat service support units, have to know where they are and how to get where they need to be next to accomplish their mission.

Map reading and land navigation are the first step in placing every unit and every weapon system, no matter what size, into effective action on today's battlefield. Every combat service support requirement calls for several people (those who ask for the service as well as those who deliver it) to know how to read a map accurately and navigate to the correct point. In addition, the Army and Air Force are adopting increasingly accurate and lethal, not to mention expensive, weapons as part of the combat support umbrella covering the infantryman's and the tanker's battlefield; but these sophisticated weapons can be no more accurate than the man who calls in his own location or that of the targets he wants engaged. As weapons become even more powerful and as their ranges stretch out, observers must report and others must plot enemy target positions faster and more accurately. Considering today's mobility, they rarely have time for more than one attempt to destroy a target before the opportunity is lost.

The AirLand battle of the future calls for both offensive and defensive operations consisting of nonlinear battles that attack enemy forces throughout their depth with fire and maneuver. These attacks require coordinated action by all available forces in pursuit of a single objective (and not necessarily a terrain objective) using the operational concepts of initiative, depth, agility, and synchronization.

The success of this concept rests in large part on the mental flexibility of the Army's leaders, who must act faster than the enemy. But it is equally important that these leaders direct the movements of units made up of personnel who can find their way quickly and accurately so they will be at the critical point at the critical time. But many of these leaders, and their soldiers too, know all too well that, today, they are not really learning and practicing these skills to any high standard.

Remedying this situation presents an obvious training challenge, and several factors get in the way of meeting it. The sheer number of people who need land navigation and map reading skills, for example, is one factor, and our present approach to teaching these skills is another.

First, our present approach assumes that soldiers naturally possess several of the prerequisite skills having to do with observing and interpreting their surroundings. But such natural skills were, in fact, lost to most of our population decades ago when we became an urban society.

In addition, there are many in the Army who disagree on how these skills should be taught and on what should be emphasized and what de-emphasized. And, finally, the Army has provided little in the way of new guidance or suggestions for presenting this instruction in ways that might produce better results. The most recent version of Field Manual 21-26 (Map Reading), for instance, is more than 14 years old and is based on manuals that have been used for several decades. And all the supplemental training circulars, TEC lessons, and pamphlets offer no more than the standard approaches found in the FM itself.

Perhaps the greatest barrier that stands in the way of strengthening land navigation skills, though, is our failure to recognize this weakness as a training problem rather than as a deficiency in the individual soldier and one that he can be expected to overcome with more of the same old training. If this same old training has not been adequate in the past and is not adequate in the present, it will probably be even less adequate in the future.

TWO METHODS

There are two basic methods of teaching land navigation: by dead reckoning and by terrain association.

A large group of people, including trainers in the Army and the Marine Corps, now favor the dead reckoning method. Land navigation by this method is a function of using a map and a protractor to determine the route and the direction of travel. These are then applied to the real world through use of a magnetic compass and various methods of estimating distances. (This procedure began centuries ago when sea captains on the Mediterranean sailed from port to port across open water in their trading ships.)

A much smaller group of people agree that dead reckoning is the best way to navigate over land but favor the techniques and equipment used in orienteering. They advocate throwing away the map protractor and the lensatic compass, saying that the orienteering style compass and pre-drawn north "grid lines" can do the job.

Then there is another group, growing in number, who advocate shifting back to the terrain association methods of the past. These people remind us that methods of estimating distance may not be precise and may become confusing when "the count" is lost. They say that paying close attention to the compass and the steering marks is

not always possible for soldiers and leaders who have other jobs as they move across the land. Further, they point to the difficulty our mechanized forces have in using a compass while moving in tanks and infantry vehicles; this requires stopping and walking away from the vehicle each time the compass azimuth is to be checked. Finally, they argue that since terrain will always present itself to the navigator and since the map can be carried along, it is more practical to navigate by terrain association.*

But there are certain problems in the thinking of each of these groups.

First, although dead reckoning is an effective method of teaching land navigation, there is no reason for excluding other effective methods. It would not be a good idea, however, for the Army to adopt the orienteers' idea of discarding the map protractor and adopting the orienteering compass with magnetic north "grid lines" drawn on the map. The present lensatic compass is superior in accuracy when locating steering marks along a given azimuth and when undertaking intersection and resection problems. It is also invaluable at night because of its luminous features. (Incidentally, magnetic north-correcting grid lines drawn on the map may not be accurate unless precision drafting tools are used, and these lines add extraneous clutter to military maps already full of detail. Even the Sierra Club in its Land Navigation Handbook, published in 1983, cautions against this practice.)

Meanwhile, those who advocate navigating exclusively by terrain features fail to appreciate the problems of moving during periods of limited visibility or at night and over terrain that is relatively flat or covered by vegeta-

**The Army's Engineer Topographic Laboratories at Fort Belvoir are presently working on the problem of providing an accurate compass reading to tank and infantry vehicle commanders as they move across the battlefield. The Combat Vehicle-Heading Reference System (CVHRS) is basically a magnetic compass that uses electronics to neutralize the effect of the magnetic field created by the metal vehicle. Therefore, a combined dead reckoning/terrain association approach will soon become feasible for mechanized forces.*

tion. They often mistakenly believe that when visibility is extremely good and there are prominent terrain features, they can accurately determine their positions on the ground even when those terrain features are quite distant. True, a navigator may be able to continue to navigate to a known recognizable point by using distant terrain formations as a guide in a place such as the Mohave Desert. But this does not necessarily mean he can locate himself at any given time either on the ground or on the map without a compass. Indeed, it is easy for him to miss the mark by several grid squares.

A person driving along an interstate highway, for example, can travel substantial distances with barns, trees, and smaller hills several hundred meters from the road "moving by" quickly, while a distant mountain peak does not "move" at all. But this does not mean the driver is not moving toward that peak; it merely suggests that he needs a precision instrument to measure that movement.

BEST APPROACH

The best approach, then, to training people in land navigation is to recognize that, while dead reckoning is an effective method by itself, more emphasis on terrain association as a supplement would improve our training. This, of course, would have to be coupled with some additional instruction on certain prerequisite skills related to observing and interpreting terrain, which most of us now lack. Greater emphasis on observation and terrain association would also pay dividends in having soldiers and units make better tactical use of the terrain they travel across or occupy.

A good place to begin might be with the training literature. While the references on land navigation do not completely ignore terrain association, most of the pages in these publications and most of the hours set aside for actual training time overwhelmingly favor the dead reckoning method. (A quick count suggests the ratio is about 10 to 1.) In addition, a soldier looking for "land navigation" in the index of FM 21-26 is referred to a paragraph entitled "Dead Reckoning"; and the comic book circular, TC 21-26 (Don't Get Lost), teaches land navigation solely by the dead reckoning method. About the only terrain association aspect really emphasized is the location of unknown points on the map through methods of resection and intersection from known points on the map and on the ground.

Most of the training methods being used now are technically correct, but they can be improved upon in several ways. The following suggestions focus upon some additional things that might be done, some changes in the order in which a few of the tasks are presented, and some shifts in emphasis.

• Insist that troops always navigate and operate with a correctly oriented map (error of 30° or less).

Current training doctrine calls for instruction on how to orient a map either with a compass or by inspection, but the training does not emphasize a requirement to use it that way all the time. Psychological research conducted at the State University of New York at Stony Brook recently confirmed the fact that even trained map users, with the simplest maps, become confused when the maps are misaligned with the actual lay of the land or the layout of a building.

These experiments also showed that as maps become more complex it becomes increasingly difficult for individuals to perform the complicated mental gymnastics necessary to get properly oriented on a misaligned map. Yet, many people in the field still use maps with the north side up, no matter in which direction they are observing or traveling.

• Include an introduction to fundamental map making techniques (survey and triangulation) in the program of instruction.

Students of map reading and land navigation must understand the fundamentals of how modern maps are made. A good example that might be used is the early scientific mapping of France in the 1670s by the Cassini family. These highly accurate maps (considering the time) were developed through a few simple but painstakingly accurate measured baselines and literally thousands of individual triangulation surveys.

• Change the order in which instruction is given on map and compass land navigation tasks.

Conversion between grid and magnetic azimuths is extremely important, but it should not be taught before instruction on intersection, back azimuth, and resection as it is now. The concept of conversion between grid and magnetic azimuths is the single most difficult map reading and land navigation skill to teach, learn, or retain. Taught first, it only interferes with the student's understanding of the concepts that follow. It should therefore be taught only after he has mastered these other skills.

• Integrate more terrain association techniques into the land navigation skill package.

Neither method — dead reckoning or terrain association — should ever be applied to the exclusion of the other. The farther a navigator travels by dead reckoning without a confirmed reference to some known point, the less accurate his course becomes. Conversely, hills, forests, ridges, and streams can all begin to look alike to him, but the compass and the steering marks can give him some important guidance when traveling across unfamiliar country. Type of terrain, amount of vegetation, visibility, and light factors can cause the navigator to vary his dependence upon one system or the other; but unless he is traveling across a featureless sea, he should never be encouraged or allowed to exclude either method.

• Teach observation and interpretation of terrain features first from field to map and then from map to field. Also, require students to translate map terrain routing instructions from symbols into words.

Except during the initial study of elevation and relief, which is introduced as part of map reading symbology, all practical instruction on the observation and interpretation of terrain features should begin with field-to-map exercises. After all, the French cartographers who first used contour lines in 1771 saw terrain features that they wanted to represent clearly on a map — not contour lines on a map that they wanted to envision as terrain features.

Today, British officer training at Sandhurst (The Royal Military Academy) includes several hours of practical "pin prick" exercises in the field. The idea is to have the student move down a known course and mark the locations of several designated terrain features on his map with pins. These experiences give the student an opportunity to observe and interpret these features and then to see how the mapmaker represented them on paper. After he becomes proficient in this skill, the student is ready to draw mental images of the various terrain features by looking at his map. (We seem to go through the process backward, or perhaps we just skip an important step.)

The final step is to have the student interpret his map along a particular route and translate the symbols into words. His translation should sound like the familiar, "Go to the third traffic light where you take a left and then to the fast food place on the right." But the student would substitute terrain features and general directions (N,S,E,W) for traffic lights, left turns, and fast food places. This verbalization can greatly improve a land navigator's chances of successfully reaching his destination, because he can now use dead reckoning, terrain association, and his own verbal instructions as guides.

• Incorporate other miscellaneous helpful hints into the instructional program.

An instructor can teach his students, for example, that a man cannot walk a straight line route unaided; that primitive man navigated by measuring the amount of travel in a particular direction in terms of time instead of distance; and that snow melts more on south-facing slopes in the northern hemisphere. He can also teach them how to use the direction of prevailing winds, slopes, stream flows, mountain ranges and ridges, along with the advantages of creating mental sound, sight, and smell maps while passing through unfamiliar country.

Incidentally, stars are not the only lights in the night sky that can be used for finding direction. Knowing where mortar or artillery illumination rounds are being fired, or in what direction a city that lights up a huge circle in the sky happens to be, can also provide important clues.

• Familiarize military personnel with the topographic maps produced by the United States Geological Survey (USGS).

Special Forces personnel and those in the Reserve Components particularly are often required to train in areas not covered by military maps. These soldiers should be told how to obtain U.S Geological Survey (USGS) maps and should be given some instruction on the special features of these maps. For example, coordinates for the Universal Transverse Mercator (UTM) grid system (used on military maps) are represented by blue tic marks along the margins outside the frame of USGS maps. By connecting the opposite tic marks from north to south and east to west, these soldiers can have an accurate military grid system of their civilian training area. In addition, all new 1:25,000 maps now being published by the USGS have full UTM grid lines printed on them.

• Develop in leaders and trainers an increased awareness that our future success on the battlefield depends to a large extent upon our training in land navigation.

Developing this awareness and improving our training in land navigation present some problems, but the problems are correctable. Although many factors have perpetuated the deficiencies that now exist in map reading and land navigation, the future success of the Army as it undergoes modernization depends to a large extent on correcting those deficiencies and bringing its soldiers up to a high standard in these critical skills.

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TRAINING NOTES

Training in the Heat

CAPTAIN DEIRDRE CHRISTENBERRY
LIEUTENANT COLONEL DAVID E. JOHNSON

A combat leader's task is never an easy one. He must use the manpower he has to its fullest to accomplish his mission, but at the same time he must not work his soldiers so hard that he loses many of them to combat exhaustion.

He must be aware, too, that combat exhaustion involves mental as well as physical factors. The mental factors enter into it when a soldier is overcome by an awareness of his own physical vulnerability. The leader's job, then, is to build up his soldiers' defenses by helping them to identify strongly with their organization and to believe that their leaders and comrades will take care of them.

But this task is especially difficult in hot climates. A unit's activities are easily and often unduly thwarted by the heat; the troops are frequently incapacitated or injured by the absence of clearly defined policies regarding the heat; and the soldiers fail to take care of their comrades because they have not been taught how to recognize the need or what to do about it when they do.

Leaders therefore need to learn how to lessen their soldiers' biological vulnerability in hot climates. This includes knowing how to recognize physical responses to the heat, how to evaluate the environment in which their soldiers must work, how to plan for and hasten their acclimatization, and how to get the best performance out of them safely by controlling both human and environmental factors.

Exposure to high temperatures places stress on the body. Among the normal physiological responses to this stress are a dilation of the blood vessels in the skin and a corresponding increase in the heart rate. Both of these adjustments increase the amount of heat that circulating blood transfers from the center of the body to the skin, where heat is lost through convection, radiation, and evaporation. But such adjustments place a strain on the circulatory system, and this stress, usually in combination with other stresses such as work, dehydration, and fatigue, may lead first to diminished performance, then to disability and heat disorders.

Heat injuries have been observed at wet-bulb temperatures of 75°F and lower temperatures, expecially if the soldiers must lower temperatures expecially if the soldiers must wear protective equipment.

The environmental conditions that influence the heat equilibrium of the body and its physiological adjustment are humidity, air temperature, air movement, and radiation (the temperature of surrounding objects). The physiological effects of these conditions are influenced by the intensity of activity, physical fitness, and type and amount of clothing.

Heat stress that cannot be adequately relieved by physiological adaptation may result in a variety of heat injuries, the type dependent on the above factors. There are three major types of heat-related injuries — heat cramps, heat exhaustion, and heat stroke. Each of these three conditions produces distinctive signs that should be recognized at once, not only by the physician but also by medical and non-medical personnel in the duty area. Immediate attention is often necessary.

Heat cramps are painful muscle spasms that occur in the extremities, the back, and the abdomen of individuals who drink large amounts of water but fail to replace the salt they lose through sweating. Cramps may

occur during or after exertion, last a few minutes, and then disappear spontaneously. The body temperature is normal unless heat cramps are accompanied by heat exhaustion.

Heat exhaustion is the most common heat-related injury seen clinically. It occurs when the blood volume is reduced by uncompensated salt or water loss during sweating. This in turn results in a blood supply that is inadequate for regulating the heat and taking care of other bodily needs.

A soldier with heat exhaustion may experience extreme weakness or fatigue, dizziness (including fainting), loss of appetite, nausea, headache, abdominal distress, vomiting, shortness of breath, and increased pulse rate (120-200 beats per minute at rest). The skin is clammy and moist with either flushed or pale complexion, and the body temperature is usually elevated to the range of 99-104 °F (37-40 °C). If untreated, heat exhaustion can progress to heat stroke.

Heat stroke occurs when the temperature regulating system breaks down under heat stress and, consequently, sweating stops. And when sweating stops, the body loses its most effective means of removing heat. Temperatures can then rise to critical levels, and the victim may die unless he gets immediate first aid. (First aid for a victim in the field should include removing his excess layers of clothing, dousing him with water, and then transporting him for medical care.)

A heat stroke victim has hot, dry skin, which can be red or spotted; he is mentally confused or delirious, may have convulsions, and may be unconscious. His body temperature is generally 106 °F (41 °C) or higher and rising. Body temperatures this high must be reduced immediately.

A leader can avoid such extreme heat-related injuries if he learns how to evaluate the environment and the health of his troops.

Of the various devices available for determining thermal stress, both the Wet Bulb Globe Temperature (WBGT) Index and the Botsball thermometer reflect the cumulative effects of the radiant heat, air temperature, humidity, and air velocity in manners that most closely correlate with the actual heat stress placed upon the human body. (Both are readily available through the supply system.)

The WBGT Index is the one most widely used for characterizing the effect of heat stress on a person. It was developed for military training in which conditions of high solar radiation are encountered. It has proved very successful in evaluating heat stress and reducing heat injuries. (The WBGT Index has been adopted as the standard by the American Conference of Governmental Industrial Hygienists as the principal index for heat stress.) It does have some drawbacks, however. It is expensive and easily broken, and it requires pencil and paper calculations.

BOTSBALL

The Botsball thermometer, which has recently been determined to have an excellent correlation with the WBGT Index, consists of a single-dial thermometer with a heat sensor enclosed by a six-centimeter black copper sphere completely covered with a black cloth. The cloth covering is constantly moistened by water from an attached reservoir. (See "The Botsball," Major David E. Johnson, INFANTRY, July-August 1981, pages 42-43.)

Outdoors on hot days, the globe of the Botsball is generally warmed by the ambient air and radiant heat and cooled by the evaporative effect of the wind and low relative humidity. Equilibrium is established when these heating and cooling effects come into balance. The Botsball temperature is a direct physical measure of the thermal environment and an extremely good index of human response to that environment.

The Botsball is the simplest, cheapest, most portable, and most accurate piece of equipment available for monitoring heat stress.

Preventing heat stress depends largely upon educating personnel — those exposed to heat and especially those charged with command and leadership responsibilities. Specifically, troops should be alerted when dangerous heat conditions exist; measures should be taken to reduce the severity and duration of their exposures; and techniques should be adopted to increase the resistance of soldiers who are exposed to the heat.

The degree of body heat load can be lessened in various ways — by reducing physical activity, by increasing the frequency or duration of rest or relief periods, and by reducing the heat of the environment. Resistance is increased by gradually acclimatizing soldiers to hot environments, by replacing water and salt that has been lost, and by physically conditioning the soldiers.

The human body is highly dependent upon sweat production for cooling. Soldiers who are subjected to the stress of heat may lose excessive amounts of water. If this water is not replaced, body temperature and heart rate will rise rapidly, ability and motivation to work will decrease, morale will deteriorate, and heat exhaustion will eventually occur.

Thirst is not an adequate stimulus for water intake. Soldiers should drink from 200-300 milliliters (about one pint) of water every half hour throughout the training period regardless of their desire to drink. (The water should be cool but not iced.) Carbonated beverages, especially those containing alcohol, a diuretic, should be avoided because they quench thirst. Flavoring or sweetener can be added to overcome the taste caused by chlorinating and salting water without making the drink too filling.

Salt, in addition to water, is lost in sweat. Unless a person is sweating continuously, he does not need salt tablets or saline fluids during the first few days of exposure to heat. The safest procedure is to replace salt losses with food intake at mealtimes. If salt must be replaced during heat stress, it should be in fluid form. A convenient way to provide enough salt to a large number of soldiers is to salt all their drinking water to a concentration of 0.1 percent.

It should be noted, however, that too much salt intake can reduce the sweat production rate and therefore increase heat accumulation. This, in turn, can result in the elevation of body temperature.

Heat acclimatization programs for personnel should be assessed in terms of the duration and the intensity of their exposure to heat (see accompanying table). A period of about two weeks with progressive degrees of heat exposure and physical exertion should be allowed for acclimatization. During this period, soldiers should be exposed to heat for several hours each day while undergoing reasonably heavy training. The heat tolerance they develop during this time will continue to increase, but more slowly, for several more weeks. The most important changes in the troops will be an increase in their sweat rate (increased evaporative cooling), an increase in blood fluids, and a decrease in the rate of salt excretion through sweat and urine. If soldiers are required to perform heavy physical training before they are properly acclimatized, their training will tend to be poorly performed, their acclimatization will be retarded, and their risk of heat injury and disability will be high.

A schedule should be established for increasingly longer training periods alternated with rest periods. The intensity of the training affects the length of time during which training can be healthfully sustained since training itself generates body heat. Once they have become acclimatized, soldiers will retain most of their adaptation for about one week after leaving the hot environment. The acclimatization will then decrease at a variable rate, with most of it being lost, usually, within one month.

CONDITIONS

A soldier's physical condition has a significant bearing on his reaction to heat stress. His susceptibility to the ill effects of heat may be increased by:

- Acute and chronic infections, including convalescence.
- Fevers.
- Reactions to immunizations.
- Vascular diseases.
- Diarrhea.
- Conditions or drugs that decrease sweat secretion.
- Skin trauma, such as heat rash or acute sunburn.
- Previous occurrence of heat stroke.
- Recent use of alcohol (24 hours).
- Chronic use of diuretics.
- Dehydration.
- Lack of sleep.
- Fatigue.
- Obesity.
- Poor physical condition.
- Increasing age.

The risk of heat injury is greatly increased in overweight, unfit soldiers, and special care should be exercised when such persons are exposed to high temperatures. One attack of either heat stroke or severe heat exhaustion (but not heat cramps) predisposes a person to a second attack. An individual once affected should therefore be exposed to subsequent heat stress with caution.

Higher heat exposures than those shown in the table are permissible if the soldiers have been undergoing medical surveillance or have been carefully acclimatized, and if it has been determined that they can tolerate training in heat better than the average soldier.

Work and training schedules should be tailored to fit the climate, the condition of the soldiers, and the situation or potential threat. Close supervision is essential if the most training or work is to be achieved with the least hazard. As the amount of heat produced by the body increases with the workload, certain schedule modifications should be considered.

Either the workload or the duration of physical exertion, or both, should be less during the first days of heat exposure and then increased gradually to allow acclimatization. Heavy work should be scheduled, if feasible, for the cooler hours of the day (early morning or late evening).

Training and work in the direct sun should be avoided as much as possible on hot days. Alternating training and

WORK REGIMENS FOR HEALTHY UNACCLIMATIZED WORKERS IN HOT ENVIRONMENTS

Work-Rest Regimen (% per hour)	WORK LOAD											
	Light				Moderate				Heavy			
	WBGT		Botsball		WBGT		Botsball		WBGT		Botsball	
	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
100% work	30.0	86.0	26.9	80.4	26.7	80.0	24.3	75.8	25.0	77.0	22.9	73.2
75% work 25% rest	30.6	87.0	27.3	81.2	28.0	82.5	25.4	77.6	25.9	78.6	23.7	74.6
50% work 50% rest	31.4	88.5	27.9	82.3	29.4	85.0	26.4	79.6	27.9	82.3	25.3	77.5
25% work 75% rest	32.2	90.0	28.5	83.3	31.1	88.0	27.7	81.9	30.0	86.0	26.9	80.4

rest periods may prove desirable. Under moderately hot conditions, 5-minute rest periods with 25 minutes of training in the sun may be desirable. Under severe conditions, the duration of rest periods should be increased.

When the temperature is excessively high, training should be curtailed or, under severe conditions, suspended entirely. Exposure to high temperatures at night as well as during the day should be avoided if possible, as it decreases the amount of training that can be performed effectively.

It should be noted here that heat injuries have been observed at WBGT temperatures of 75 °F (24 °C) and lower. Overexertion can cause heat injury at even lower temperatures, especially if the soldiers must wear personal protective equipment (gas masks, butyl rubber or charcoal impregnated suits) in their training.

REDUCING EFFECTS

There are several ways of reducing the direct effect of heat upon soldiers. Clothing and equipment, for example, should be worn in a manner that permits the free circulation of air between clothing and the body surface. Wearing shirt collars, shirt cuffs, and trouser bottoms open will aid in ventilation. (This practice may not be advisable, of course, in those areas where loose fitting or open style clothing presents a safety hazard.)

In the presence of full sunlight or a high radiant heat source (a furnace or generator, for example), keeping the body covered with permeable clothing reduces its radiant heat load. When heat exposures do not include much radiant heat, removing outer clothing helps reduce body temperature.

Impermeable clothing should be avoided unless it is required for protection against toxic agents. If such clothing is necessary, precautions must be taken to avoid the resulting rapid buildup of body heat, since heat illnesses may show up within minutes. (Personal protective equipment that alleviates heat stress is available for certain situations.)

A cool rest area allows body heat to reduce to average preexposure levels during alternate training-rest schedules and during breaks. A rest area temperature of about 75 °F (24 °C) is best. Water supplies should be located at or near rest areas.

Ventilation for heat control in buildings such as motor pools can be either local or general. General exhaust ventilation requires large quantities of cool make-up air and is frequently less cost effective than local ventilation. Besides, increased ventilation cools the skin only if the air temperature is less than 95 °-100 °F. The best supply air temperature for providing practical heat relief is 80 °F. Portable floor fans can be used in maintenance areas to increase air velocity; they can be moved to direct the air supply on the workers and can be adapted to daily and seasonal changes in heat exposure and air supply.

A hot environment and the way troops perform in it can be dealt with in a manner that benefits physical and psychological readiness as well as productivity. A knowledgeable, well thought-out approach to activities in the heat not only improves performance but also produces acclimatized troops who have learned how to function at their best in such environments.

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Emergency FDC Techniques

STAFF SERGEANT JOHN E. FOLEY

It can happen. Your M577 Fire Direction Center (FDC) is mistaken for a T-62 and hit by 10 or 12 TOWs, or the enemy scores a direct hit on the FDC bunker. And no one thought to bring the spare plotting board.

This should be no reason for the mortar section to take a break and wait until the S-4 can find and deliver a new graphic firing fan, M-16 plotting board, or mortar ballistic computer. The guys out front still need fire support.

But for a mortar computer or any other mortarman to continue to provide accurate fire without his conventional devices, he has to have a considerable amount of skill, imagination, and confidence. If this ever happens to you, will you have that skill, imagination, and confidence? You

will — but only if you plan for it now.

There are several improvised procedures you can use on the battlefield to make this task easier. They aren't as accurate, of course, but they'll allow you to place fire on a target and continue your mission, even under the most adverse conditions.

The techniques that come immediately to mind in these instances are the direct lay and the direct alignment methods of fire. These methods — normally used in emergencies only and then with only one gun — are covered in depth in FMs 23-90, 23-92, and 7-11C1. But you can carry them a step further when necessary and use them for an entire platoon.

The direct lay method is the least desirable, because you're exposed to the enemy. It is the fastest method of engagement, though, and you should try it. Here is how you do it.

First, have your section align on the target and use your base gun to range in (initial deflection 3200). Have your other guns follow along with the deflection the base gun uses. As the gunner moves his sight onto the burst, then re-lays his mortars on the target, he can call out the deflection, and the other gunners can place that deflection onto their sight units and also lay on the target. (This method will work best if all the guns have been properly boresighted, preferably by the same man.) The other guns will also follow along with the charge and elevation of the adjusting gun.

The next step is to fire for effect and then leave fast! This method is rapid and provides the maximum amount of fire on a target with the least number of adjusting rounds.

When the terrain and situation permit the use of the direct alignment method, here is what you do:

Once the base gun is aligned on its stake and is preparing to fire the first round, the section sergeant shoots an azimuth across the gun to determine its direction of fire. Then, he positions and lays in the other guns, using the technique of laying the mortar for direction with the M-2 compass.

Once this is done, have all the guns place out aiming stakes and slip the scales so that they all read 3200 (or the same deflection).

Finally, the section sergeant writes down the corrections that the base gun squad leader (or whoever is acting as the forward observer) calls out, using the LARS rule for deflection (left, add; right, subtract) and a firing table, and translates the corrections into deflections, charges, and elevations.

As long as the observer stays within 100 meters of the gun-target line, this method is quick and accurate. The target hit data can be recorded on DA Form 2188-R (Data Sheet), if one is available, or in your notebook. With this data, fires can be rapidly placed back onto the targets with only minimum adjustment or the data can be used for shift missions. If someone outside the platoon should call for a mission and is more than 100 meters from the gun-target line, the missions can still be fired, but accuracy will fall off since all corrections are being made from the gun-target line and not the observer-target line. This means more rounds will be needed to adjust.

THIRD METHOD

These are emergency procedures only, of course. If you have the time and you stay in one area for an hour or more, you can use a third method of fire control and construct an improvised observed firing chart. In fact, whether you stay in the one position or displace, you can make an improvised observed firing chart out of materials on hand. What you will need is paper (or anything that can be written on — cardboard, a flat piece of steel, the shirt off somebody's back), a straight-edge, a map of the area, a protractor (GTA 5-2-10), and something to write with. Most of the materials can be found or scrounged quickly.

To construct an improvised observed chart, draw a grid system on your paper, taking care to make all the squares the same size. Scale is not as important as seeing that all the squares are the same size. The more accurately you draw your squares, the more accurate your fires will be. When you superimpose the grid system from your map onto the grid system you have drawn, you have made an observed firing chart. (You could have used your map itself, but this way you keep your map clean and will not have any intelligence on it.) Once you've made and numbered your grid system, you're ready to plot. By measuring the size of the grid squares, you can determine where to make your six- or eight-digit grid locations on the chart.

To use this system, this is what you do:

- Superimpose your map grid system onto the grid you've drawn.
- Plot your mortar location, forward observer location (if known), and target location.
- Using your straightedge, draw a straight line between the mortar position and the target location. Place your protractor over the mortar location and determine your azimuth.
- Determine the range on the basis of all the squares of your grid system being 1,000 meters across (horizontally and vertically) and 1,400 meters across diagonally.
- Convert the azimuth into a deflection using the RALS/LARS rules for azimuth and deflection. Thus, if the azimuth increases, the deflection decreases, and if the azimuth decreases, the deflection increases. Use whatever azimuth your guns are mounted on (mounting azimuth) as your start point for your deflection scale and have stakes placed out on the deflection that corresponds to the mounting azimuth. For example, if the mounting azimuth is 1600 mils, the referred deflection is 2800 mils, and the azimuth to the target is 1330 mils. This is a difference in deflection of 270 mils. Using the LARS rule, you would add this difference (270 mils) to the referred deflection of 2800 mils. This would give you a deflection to fire of 3070 mils. If you have the 107mm mortar, you would also add a drift of about 35 mils, which is the midpoint between the maximum and minimum drift for the cartridge, HE, M329A1. Since drift is a left correction, it is always added.

Now that your mortars are laid in the direction of fire, you need to know what charge and elevation to use for the range you determine. This is the time to look at your firing tables.

The 81mm and 60mm mortars adjust range by both charge and elevation adjustments. Because of the extremes of elevation and charges possible and the overlapping range characteristics of the ammunition, it is impossible to make an accurate estimate of the charge and elevation for these mortars. The best way to determine the charge and elevation for both, therefore, is to use a firing table. The second best method is to use the abridged firing table that comes packed with the ammunition. This is better by far than not having anything.

But even when you have no firing tables for a 60mm or an 81mm mortar, you still have an alternative. First, for both mortars being used in the ground mounted role, the maximum elevation is 1511 mils and the minimum elevation is 0800 mils. (In the M125A1 mortar carrier a maximum elevation of 1598 mils and a minimum elevation of 713 mils are possible. See page 8, FT 81-A1-3.) Using your experience, your familiarity with the firing tables, and luck, consider that you have a charge range of 0 to 9 with the 81mm mortar. At the minimum elevation (0800), the maximum range is as shown here for each charge.

Charge	Maximum Range
0	401 meters
1	1,037 meters
2	1,508 meters
3	1,991 meters
4	2,466 meters
5	2,929 meters
6	3,374 meters
7	3,802 meters
8	4,209 meters
9	4,595 meters

You should try to memorize the maximum range for each charge for both the 60mm and 81mm mortar. Then, when faced with an emergency, you should be able to closely estimate the charge and elevation you will need to hit your target. (This is the least desirable method of determining charge and elevation, but it beats nothing. And with experience and practice, you should be able to make swift and accurate changes in range without the aid of a firing table.)

With the 107mm mortar, there is a fixed elevation and a varying charge. In an emergency, therefore, when you need to fire and do not have either firing tables or a ballistic plate, you can use another improvised method to estimate the charge you need to hit a target. This method comes from a study of FT 4.2-H-2 and is based on a maximum range for HEM329A1 ammunition of 5,650 meters (elevation 0800 with extension) charge 41, and a minimum range of 920 meters (elevation 1065 without extension) charge 5. Using these two extremes, and what you remember from studying the firing tables, you should be able to determine the approximate charge needed.

I have found that for elevations 0800 and 0900 with or without extension, one-eighth of a charge will move the round 20 meters most of the time; at elevation 1065, it will move the round 10 meters.

With practice and common sense, this can be a very accurate way of getting your mortars onto a target. Remember that when you use it you will not have the normal FDC equipment; you will have only some guns, ammunition, men, and, hopefully, communication equipment. The whole idea is to keep putting fire on the target, no matter what.

The three techniques discussed here are for emergency use only — when there are no other means of fire control. Any one of them can be accurate and effective, but it takes a competent computer to determine the data to fire. Using data from missions you have fired successfully or from the team drills that are given to each Infantry mortar platoon course student at Fort Benning, you can train your computers and squad leaders to effectively control their fire even if they do not have FDC equipment.

Fire control is based on a direction and a distance from a gun to a target. If it seems you have lost everything, stay calm, use the techniques discussed here, and keep shooting.

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Mortars in the Desert

LIEUTENANT DOUGLAS W. McENIRY

The United States Army has not fought a major battle in the desert, let alone a war, since the North African campaign during World War II. Now, in the Army of the 1980s, attention is once again focused on the possibility of conducting desert operations. Several major field exercises, such as the annual Bright Star maneuvers and our continued use of the National Training Center at Fort Irwin, California, are helping to build our in-

formation on desert operations. But there is still a great deal to be learned.

One such area that has not been fully explored is that of how to employ and use the infantry mortar effectively in the desert. Currently there are no specific guidelines in any of the available references on the tactical employment or the general use of mortars in the desert. This indicates that the issue is an open one and that the Army should give some kind of consideration to it. If the doctrine must be changed or new techniques developed, it is to our advantage to do so now. We certainly cannot afford to wait until the heat of battle is upon us to decide how we will settle a baseplate or displace a section in desert terrain.

Aside from the tactical employment of mortars in the desert, there are certain other considerations and situations that must be addressed. And on the basis of my experiences as leader of a battalion 81mm mortar platoon while on duty in the Sinai with the 101st Airborne Division (Air Assault), I offer the following thoughts on using mortars in desert operations.

First, the terrain affects the ability of mortarmen to support a unit effectively while it is conducting operations. Solid ground for good firing positions is not always available. The surface (at least in the Sinai) generally ranges from very coarse to very fine sand. In places where the surface is not sand, it is either sandstone or decaying granite or coral reef. Such surfaces cause problems in settling the baseplate and in constructing mortar firing positions.

When soft sand can be found it is, of course, the best place to put the baseplate. Where there is only rock or coral reef, a layer of proportionally filled sandbags has to be put down first and the baseplate placed on top of them. The sandbags help prevent cracked baseplates and damaged cushion rings, which might occur during the firing of higher charges.

When constructing a standard mortar firing position as outlined in FM 7-11C1, Indirect Fire Infantryman, or in FM 5-15, Field Fortifications, sandbags or, if they are available, used ammunition crates can be put in place to keep the sides from caving in. The problem of cave-in can also be overcome if the sides are properly revetted and deadmen put into place.

Another problem with the terrain is that it offers little cover or concealment. Defilade positions, the best form of cover for a mortar, are rare. Consequently, unless firing is done from a constructed mortar pit, the crews are exposed to enemy fire.

Concealment in the desert is equally difficult, but there are a few possible solutions. One is the radar deflective desert camouflage net, which can be used to break up the outline of a gun pit quite effectively, or as concealment for ammunition or vehicles. Vegetation is sparse to nonexistent, and what there is is usually green. Even when this vegetation can be used effectively, it tends to stand out because it conflicts with the dominant sandy color.

To conceal the sandbags used in mortar pits the crewmen can first paint them with a white or tan paint and then, while the paint is still wet, toss loose sand or dirt directly onto the painted areas. The sand or dirt adheres to the sandbags, and when it dries it effectively breaks up the outline and helps to reduce shine.

Road networks and general trafficability are a problem, too; hard-surfaced roads are not always available, and cross-country movement is more the rule than the exception. When wheeled transportation is used, it must be able to keep up with the unit it is supporting.

WEATHER

Besides these terrain limitations, the weather, too, can have adverse effects on everything from the gun crews to the weapon systems and the ammunition. First, it took my soldiers an average of two weeks to become acclimated to the Sinai before they could operate at the level they had achieved in the United States. During this time, each man drank more than three gallons of water in an average eight-hour day. Their effectiveness was sluggish at first until routines were established. Rest, too, was a key factor. By the end of the two weeks, they were able to stay in open work areas for up to 12 hours, and their water consumption decreased to an average of one to one and one-half gallons per man per day, depending on the daily activities.

HOT METALS

During peak hours of the day in the desert, any exposed metal (such as the baseplate or cannon) becomes extremely hot. This means that the troops have to conduct crew drill with sleeves down and wearing gloves to avoid severe burns from contact with the metal. (The gloves do somewhat impair the gunner's ability to manipulate the sight.)

The effect of the severe heat in desert areas on mortar ammunition needs further study. I have seen, for example, what can happen to white phosphorus rounds when they are exposed to temperatures above 85° Fahrenheit before firing, even when precautions have been taken. The rounds tumble end over end, and many fail to explode when they hit the ground.

Other questions that need to be considered are "Should meteorological (METT) data be computed in order for mortar fires to be accurate?" and "Will mortars need to be near a METT station to insure accurate firing data?" Wind speed and direction in the Sinai are unpredictable, and their effects on rounds will have to be considered. This is especially true if a precision registration is to be fired.

With the harsh conditions found in the desert, maintenance is also a subject to be considered. Sand or dust is the biggest problem in maintaining the mortar and its associated fire control equipment. Whenever possible, the cannon should be covered with the muzzle cover. This prevents sand and dust from getting inside and causing possible misfires later. The sight and the aiming circle, too, should be kept covered when not in use. The working

parts of the mortar, such as the traversing and elevating mechanisms, should be only lightly lubricated to prevent a possibly abrasive paste of sand and oil from forming.

The desert is different in so many ways from other environments in which we normally employ mortars. Now that we are again faced with the possibility of conducting desert operations, we need to reexamine these differences. Only by learning in advance what needs to be done can we be sure that responsive indirect fire from our mortars will be available when it is needed.

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Winning at the NTC:
Defeat at Brigade Hill

MAJOR VERNON W. HUMPHREY

Small units have to be well prepared to fight the defensive battle, and this includes mobility and defense in depth. Sometimes the units that go to the National Training Center (NTC) at Fort Irwin for their 14 days of training learn these lessons through defeat, as one unit did at a place called Brigade Hill.*

The area in which this particular battle took place is a bowl-shaped valley measuring about six kilometers from north to south and seven kilometers from east to west. The floor of the bowl is slightly undulating and is cut by many small gullies that offer cover and concealment for small elements. Larger gullies or wadis offer considerable cover and serve also as excellent avenues of approach. The entire area is bisected by the "Irwin River," actually a paved road with designated "fording sites."

The key terrain in the area consists of Hill 876, the Dumbbell, the 922-955 hill mass, the fording sites themselves, and Brigade Hill. The passes between Hill 876 and the Dumbbell, and between the Dumbbell and the 922-955 hill mass, are quite restrictive since the hills themselves cannot be traversed by vehicles and can be climbed only with difficulty by dismounted infantry. Although it is dominated by the higher hills to the west and south, Hill 780 does provide cover and concealment for forces approaching from the east (see accompanying map).

THE MISSION

The U.S. task force was ordered to defend in sector, against an attack from the east, with its initial battle line running from Hill 876 to the Dumbbell to the 922-955 hill mass.

The task force's plan called for its Team Alpha to defend intially in the vicinity of Hill 876. Its Team Bravo was to defend in the vicinity of the Dumbbell, while its Team Charlie was to defend the pass between the Dumbbell and the 922-955 hill mass. Obstacles, consisting of antitank ditches, wire, and mines, were to be constructed in the passes. The companies were also directed to reconnoiter positions in the vicinity of Brigade Hill.

At first light, several units reported OPFOR movement. Most of the reports concerned small units moving at high speed. On the heels of these reports, motorized OPFOR elements drove past the U.S. task force's TOC. The task force commander ordered the task force to fall back to positions near Brigade Hill.

One team had just been resupplied, but it pulled out and left its log pack on the ground. As the task force pulled out, its attached engineer company could be seen working on the obstacles. Not aware of the task force's pull-back, the engineers continued working, and eventually "went into the bag" without firing a shot.

The task force raced pell-mell for the Irwin River, with each team commander choosing his own route. Eventually, Team Bravo took up a perimeter defense in the immediate vicinity of Brigade Hill. Teams Charlie and Alpha took up perimeter defenses about 1,000 meters apart along the edge of the major wadi to the west of Brigade Hill. None of the companies covered fronts of more

* *This is the third in a series. The views expressed are the author's own and do not necessarily reflect those of the Department of Defense or any element of it.*

than 300 meters. All company positions were under continuous observation by OPFOR motorcycle scouts, who could be seen about a kilometer to the rear of each company.

About two hours after the task force arrived in its new positions, smoke and dust on the horizon heralded the arrival of the OPFOR's motorized rifle regiment. With little opposition, the first motorized rifle battalion crossed the Irwin River just to the north of Brigade Hill. Because rolling terrain masked the fires of Teams Alpha and Charlie, the OPFOR battalion was able to bypass Team Bravo with few losses.

About ten minutes later, another motorized rifle battalion drove straight into the gap between Teams Alpha and Charlie. The latter team, which was tank heavy, found its fires masked by the terrain; Team Alpha managed to fire only one TOW round.

With the OPFOR battalion streaming through the gap, Team Alpha began to disintegrate. A BTR-50 drove into the rear of one of Team Alpha's platoons, and the OPFOR soldiers dismounted and aggressively attacked and destroyed one squad. The other two U.S. squads in this platoon watched the attack but gave no assistance. The OPFOR squad then turned on, attacked, and destroyed each of those squads. Unable to start their BTR-50, the OPFOR soldiers, on foot, followed in the wake of the OPFOR attack and engaged and killed two other U.S. squads that had been bypassed.

With the U.S. task force now faced with total defeat, Team Charlie received the order to pull back. As it pulled out of its defensive perimeter, the task force found itself driving into the flank of a third motorized rifle battalion. A few U.S. tanks opened fire, but Team Charlie's commander, interpreting his orders to move as precluding him from engaging the OPFOR, ordered a cease fire. The OPFOR battalion then turned parallel to Team Charlie, attacked its flank, and destroyed it in about three minutes.

ANALYSIS

Counterreconnaissance and intelligence-gathering by the U.S. task force during this operation were poor. The initial reports of six OPFOR reconnaissance vehicles had been made by two different observers who saw the *same vehicles*. These two sightings had been added together at the TOC, and this had given the impression that a full OPFOR motorized rifle battalion had penetrated the battle lines. This impression had been reinforced when one of the OPFOR reconnaissance vehicles had driven past the TOC, firing a machinegun. (More than one U.S. unit at the NTC has been chased out of its initial positions by the OPFOR's reconnaissance elements in just this way.)

Neither the task force's positions near Brigade Hill nor the routes to them had been reconnoitered. No one on the U.S. side seemed to realize that the gently rolling terrain would prevent the units from firing on the fording sites from the defensive positions along the wadi. Too, the movement to the new positions was confused, and command and control broke down completely, as evidenced by the loss of the engineers.

Once in their new positions, the U.S. company commanders were not sure of their locations or boundaries and seemed to be unable to improvise an effective defensive plan, probably because they did not know the task force commander's intentions. Little or no coordination was made between teams, as evidenced by the gaps in the position. No one checked the positions, although there was plenty of time. There was no fire support plan, and only one fire mission was called during the entire action.

Service support played a significant role in the action. The abandonment of a log pack — after 72 hours without hot food, and with little remaining fuel or water — was especially demoralizing to one team. Team Alpha was able to fire only one TOW round, because that's all its TOW section had, and no one in the task force knew its ammunition status. In a previous engagement, several tanks from the task force had been evacuated with full loads of ammunition aboard. These tanks had not yet returned, and the ammunition was sorely missed.

The speed and shock of the OPFOR attack was demoralizing to the U.S. units. When the OPFOR infantry came in behind their tanks, the U.S. units considered themselves already beaten and were unable to muster an effective defense.

Things might have gone differently in this battle if the U.S. task force had used an alternative plan such as the following one:

The task force establishes OPs on Hill 876, Hill 955, the Dumbbell, and Hill 780, and reinforces them with TOWs and tanks. The scout platoon mans the OPs.

Obstacles are placed in the same places as called for in the original plan, but infantry squads are dug into them. TOWs and tanks are positioned to fire on the obstacles. Platoons, protected with wire and close-in minefields, occupy strongpoints at the fords in the Irwin River. The main battle position is established on the first ground west of the Irwin River from which fire can be placed on the fording sites.

During the initial stages of the battle, the scout platoon passes information to the task force's S-2, who carefully evaluates it. The infantry units in the obstacles engage the OPFOR reconnaissance elements to prevent any penetration of the obstacles themselves.

As the OPFOR main force approaches, the scout platoon brings it under artillery fire and keeps fire on the OPFOR all the way in. When the OPFOR reaches the obstacles, the dug-in infantry engages the breaching force, picking off engineers, killing exposed crewmen, and knocking out vehicles. At the same time, the scout platoon brings tank and TOW fires to bear on the OPFOR's flanks and rear. The tanks and TOWs located near the fording sites add their fires.

The OPFOR must now fight three separate battles — a short range battle at the obstacle, a long range battle with the forces near the fording sites, and a third battle with the scout platoon on their flanks and in their rear. The OPFOR can either stop to fight it out with the scout platoon and dug-in infantry or press on and take its casualties.

If the OPFOR elects to fight it out, its units will certainly pile up, lose their momentum, and offer a lucrative counterattack target. If the OPFOR units move on, the tanks and TOWs near the fording sites can move back to the main battle positions, the scout platoon can follow the OPFOR and fire on it from the rear, and the entire process will repeat itself when the OPFOR hits the dug-in infantry at the fording sites.

Thus, several lessons can be learned from the defeat at Brigade Hill:

- Initial contact reports can be unsettling — and are usually grossly inflated. Care must be taken to winnow the chaff from the wheat. This is best done by putting scouts well out and by working hard to get accurate reports from them.
- Counterreconnaissance is essential. The OPFOR reconnaissance elements won the opening round of this battle with a total of six vehicles.
- Nothing is more important than killing the enemy. Commanders and leaders should never pass up an opportunity to deal a lethal blow, no matter what else they're doing at the time.
- Carefully planned and coordinated defensive positions in great depth are essential. Linear positions, particularly if not coordinated, are as fragile as eggshells.
- Commanders and leaders at all levels must know the task force commander's intentions and must be trained to implement these intentions. As a minimum, unit leaders must be trained to always maintain contact with adjacent elements and to coordinate their defenses with those elements. This should be automatic.
- Without service support, the best plans are useless. Weapon systems without ammunition, men without food and water, and vehicles without fuel are also useless.

Small units must be trained to *fight*. Regardless of how hopeless the situation appears, small units that are prepared to sell their lives dearly can often turn the tide, while units that give up are usually slaughtered like sheep.

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OPFOR Shooting Gallery

CAPTAIN NOYES B. LIVINGSTON III

After reading an article in INFANTRY about an indoor "combat theater" in Italy, the S3 of my National Guard battalion decided to adapt the idea for our unit. (See "Combat Theater," by Sergeant First Class Jimmie Ferguson, INFANTRY, March-April 1981, page 41.) The theater in Europe used, among other things, a movie projector and a computer to conduct marksmanship training; ours would have to use the less ex-

pensive equipment that we already had on hand. The project that grew out of this idea proved to be as enjoyable as it was educational.

What our battalion calls the OPFOR Shooting Gallery is an indoor range on which a rifle squad fires .22 caliber rimfire ammunition at images projected from slides of opposing forces (actually their fellow soldiers dressed in opposing forces uniforms). The shooting gallery can be set up in about 10 minutes, and a squad can be briefed and can fire two missions in less than an hour.

Other units as well might find such a shooting gallery useful. The following list shows the equipment needed to build it:

- Two adjacent .22 caliber rimfire target backstops (four adjacent backstops are preferred for safety).
- Six M16 rifles with M261 rimfire conversion kit adapters installed and zeroed.
- Six or more M16 magazines with .22 rimfire magazine adapters installed and zeroed.
- One hundred rounds of .22 rimfire ammunition (two boxes) per squad.
- Thirty or more feet of wide white kraft or butcher paper.
- A carousel slide projector.
- An extension cord.
- A sturdy three-foot-high projector stand.
- Several rolls of white pasters.
- Three or four sandbags for each squad member.
- One score sheet for each squad.
- Shades to cover range windows.
- A remote switch for the lights.
- Several sets of slides.

First, the slides are made using a 35mm camera and slide film. They show a squad portraying an opposing force unit in various actions such as moving, attacking, or being ambushed. Having the slides incorporate road, trail, or other prominent terrain features helps give the activity an impression of heading and motion. After the slides are developed and mounted, about ten to twenty from each activity are arranged in sequence according to what the particular scenario calls for.

Among the scenarios we developed, for example, are a movement to contact and an ambush, both of which have proved effective. During the movement scenario, the squad on the firing line sees individuals or small groups of enemy soldiers in various defensive positions alongside a road. The squad must fight its way past each roadblock so it can continue its mission. The squad leader, of course, has to look at the big picture to direct his squad's fire instead of just joining in the shooting.

The ambush is the most suspenseful of these scenarios, because the squad has to watch an enemy patrol move along a trail into a kill zone the squad leader has selected earlier when he first viewed the slides. The squad members cannot open fire until he does, and they have only a moment to kill all the enemy soldiers in that single slide.

Three men are needed to operate the OPFOR Shooting Gallery. The person in charge orients the squad, runs the projector, and controls the scenario and the timing of the slides. An assistant acts as the safety supervisor and the scorer. A third person can be used to keep observers away from the firing line and to operate the lights if a remote light switch has not been installed.

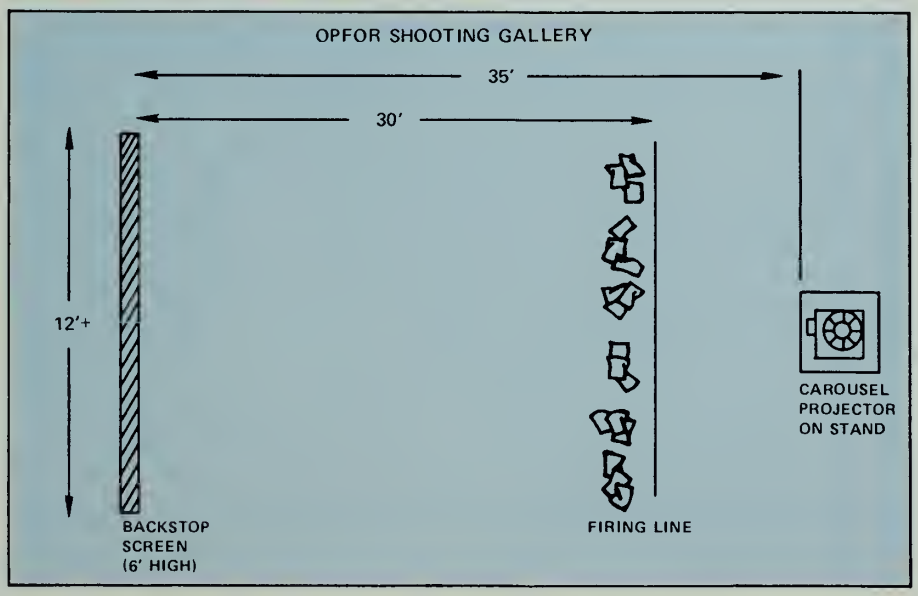
The projector is set up on a stand about 35 feet from the target backstop (see sketch). The white paper is stapled across two of the backstops to make a screen about 12 feet wide. The firing line is in front of the projector and about 30 feet from the screen. When a slide is projected from this distance, the image covers an area about 10 feet wide by 6 feet high.

The shooting gallery can accommodate six squad members at a time. They fire from kneeling, sitting, or prone positions behind sandbags, with their squad leader kneeling slightly behind them to control their firing and to redistribute ammunition.

The squad members are briefed on the range, the slide scenarios, and safety. They are then given ammunition, earplugs, and M16 rifles equipped with M261 .22 caliber rimfire adapters. The adapters have been zeroed earlier by the range personnel to hit inside a dot the size of a quarter at 10 meters. The squad members take their firing positions and are shown sample slides so they know what to look for.

When they are familiar with a particular scenario and when the squad leader is ready, the lights are turned off and the slides are projected on the screen. The first four or five slides set the scene but do not have any targets in them. The squad members see, for example, the road as they "advance" along it, the approaches to a kill zone as they lie waiting for the enemy, or the slope they are defending.

Each of the remaining slides is projected in turn for about 10 to 20 seconds, depending on how long the person in charge thinks is necessary to simulate the situation. When the



squad leader sees an enemy soldier, for instance, he orders the squad to open fire and tells them where to fire. A squad member can also do the same thing, but the squad leader shoots first. The targets are engaged with semi-automatic fire. Because of the noise of the weapons, loud, confident commands must be given.

When the exposure time for a slide has expired, or when the squad leader calls cease fire, the projector lamp is turned off with the slide still in place and the cooling fan left running. The projector must remain stationary so the bullet holes will maintain their original relationship to the slide targets. The range lights are turned on, the magazines removed from the weapons, and the weapons cleared and laid down pointing toward the screen.

The scorer and the squad leader then walk up to the screen, and as the slide is projected on it again, count the hits on the enemy soldiers. (It may be necessary to turn the range lights off after the two men have moved forward so they can see the targets better.) After counting a maximum of three hits in each enemy, they record the score for that slide on the score sheet and then cover the bullet holes with the white pasters. After the scorer and the squad leader are through, the range lights are turned on (if they have been off) so the weapons can be reloaded.

This procedure is repeated for each slide that the squad fires at until the scenario is completed. Slides that do not have targets, or those with targets that are not discovered and fired on, are projected for the appropriate interval and then the next slide is projected. If the squad leader has given good corrections on his return from scoring the previous slide, and if the squad members respond to his orders during the current slide, each enemy soldier shown on the following slides will be hit. For each enemy soldier who was not hit at least once, three points are subtracted from the squad's score. The score sheet (shown here) is designed to allow the slides to be rearranged or changed in number.

The OPFOR Shooting Gallery is inherently safe because of the static firing line arrangement, the small number of soldiers firing, the ammunition used, and the close, personal supervision that can be given to each soldier. The critique at the end of each scenario is valuable because the last slide fired at can remain on the screen where the squad members can examine it and see how well they shot.

The gallery has been useful, too, during our rifle companies' forced march-live fire exercises. We operate it for each of the squads in the exercise as they wait their turn to leave. This program gives the riflemen an idea of what to expect at the end of the march, prepares the squad leaders to direct their squads' fires, and helps get them in the mood to compete and shoot.

OPFOR Shooting Gallery

Squad _____ Platoon _____ Company _____

Squad leader _____ Number of squad members _____

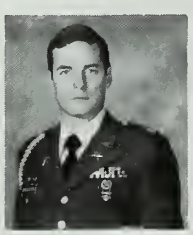
The rifle squad will encounter two situations - a meeting engagement with an enemy outpost during a movement down a road and an ambush of an enemy patrol. In both situations the squad leader will start, control and stop his squad's rifle fire. He must take charge. Each enemy soldier is a target. A maximum of three hits will be counted as possible and actual hits in one target. Each hit is a point. Any target not hit will subtract three points from the squad's score. Each slide will be marked with the possible and actual points scored and the number of survivors.

MEETING ENGAGEMENT possible/actual/survivors	AMBUSH
Slide Number	Slide Number
1. ___/___/___	1. ___/___/___
2. ___/___/___	2. ___/___/___
3. ___/___/___	3. ___/___/___
4. ___/___/___	4. ___/___/___
5. ___/___/___	5. ___/___/___
18. ___/___/___	18. ___/___/___
19. ___/___/___	19. ___/___/___
20. ___/___/___	20. ___/___/___
Total Possible Hits _____	Total Possible Hits _____
Total Actual Hits _____	Total Actual Hits _____
Survivors (-3) _____	Survivors (-3) _____
Total Points _____	Total Points _____

GRAND TOTAL POINTS _____

The OPFOR Shooting Gallery can also be used to improve a unit's skills in target detection and identification, marksmanship, communication, leadership, and teamwork.

Once a squad uses our shooting gallery, its members are always eager for a re-run.



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ENLISTED CAREER NOTES

HELP MANAGE ASSIGNMENTS

The Enlisted Personnel Management Directorate (EPMD) has two basic goals. The first of them is to meet the Army's Military Occupational Specialty (MOS) and grade distribution requirements, while at the same time assigning the right soldier to the right job at the right time, with the least inconvenience possible to the soldier and his dependents.

The second goal is to ensure an equity of assignments for all soldiers in both the continental United States (CONUS) and overseas. This means considering such matters as the date a soldier returned from overseas (DROS); the diversity of his assignments (recruiter, drill sergeant, staff position, troop leading positions); the strengths of gaining and losing commands; and the soldier's availability, desires, and need for an assignment.

In trying to meet these goals, the EPMD uses a variety of tools in making assignments for you, the individual soldier. One of these tools is your Enlisted Master File (EMF), which is continually updated through SIDPERS entries made by your servicing Military Personnel Office (MILPO). These entries may include your DROS, changes in marital status, present duty position, and any stabilization that duty position requires.

EPMD also uses your Career Management Individual File (CMIF). Your career branch automatically develops this file when your MILPO registers you as being promotable to the rank of staff sergeant. (Files on soldiers in ranks below staff sergeant are not maintained at MILPERCEN.)

The CMIF contains the following items, among others:

- Official Military Personnel File (OMPF) microfiche (procured from Fort Benjamin Harrison).
- Hard copies of Senior Enlisted Evaluation Reports that have already been posted to your OMPF.
- DA Forms 2 and 2-1.
- DA Form 2635 (Enlisted Preference Statement).
- Volunteer applications (DA Forms 4187).
- Reclassification actions.
- Letters written to the Branch.
- DA Form 10A (with MOS/Skill Qualification scores).

Of these, Forms 2 and 2-1 are especially useful. When you screen and update your DA Form 2, your servicing MILPO enters in the EMF any changes you have made in your assignment preferences. And upon completion of your annual records review (normally done during your birth month), your MILPO must prepare and forward to your career branch a complete copy of your DA Form 2-1 (as required by AR 640-2-1).

This latter form is invaluable to the managers considering your assignments, because the information in it is not normally found anywhere else in your file:

- Assignment history.
- Previous duty positions.
- Military and civilian schools completed.
- Overseas tours completed, and where.
- Aptitude test scores.
- Assignment limitations.
- Awards and decorations.
- Additional skill identifiers (ASIs).
- Skill Qualification Identifiers (SQIs).
- Location of dependents.

If these important facts and others in the file are outdated, this can have a major effect on your assignments.

You can directly influence the assignment process by ensuring that a current DA Form 2635 is on file with your branch. Under AR 614-200, you must submit an Enlisted Preference Statement through your MILPO to your career branch at MILPERCEN within 30 days after your promotion to staff sergeant. But you may also voluntarily submit a new DA Form 2635 any time an item on the previous form changes.

Here is some of the information this valuable form provides your assignment manager and career advisor:

- Duty position preferences (troops, staff, instructor, ROTC, ARMR, First Sergeant).
- Service schools desired (Drill Sergeant, Recruiter, First Sergeant courses, for example).
- Dependents and their ages.
- Unique assignment considerations (joint domicile, sole parent, special dependent care requirements).
- Typing ability.
- Remarks concerning unique qualifications for specific assignments.

In short, your assignments are based, to a large extent, upon the information that is available to your career managers at the time assignment decisions must be made. For more information and help in seeing that this information gets to EPMD, see your Personnel Assistance Center NCO (PACNCO).

The chief goal of Infantry Branch is to make the best possible assignments, not only for the Army but also for you.

NCO LOGISTICS PROGRAM

The Noncommissioned Officer Logistics Program (NCOLP) is designed to fill the unit commander's critical need for highly trained NCOs to fill select positions that require

knowledge in two or more logistics functions. More than 2,000 such positions have been identified and entered into The Army Authorization Document System (TAADS). Most of these positions are now in the ranks of SFC/PSG and above.

These positions are recommended for NCOLP designation by commanders. Once a recommendation is reviewed and approved, all changes to it must be forwarded to the Office of the Chief of Staff for Logistics. This system is not designed to interfere with the commander's prerogative of identifying specific MOS requirements; it is intended to centralize the control of these designated NCOLP positions.

Membership in the NCOLP is purely voluntary. AR 614-200 prescribes the program's objectives and responsibilities, the prerequisites for entry, the utilization of members, and other management aspects. But the people who do the recruiting — current members, sergeants major, and logistics unit commanders — must make sure the NCO meets the prerequisites. Once the NCO has been recruited, an application is forwarded to MILPERCEN, where a board meets to select the best qualified NCO for the position.

Members of the NCOLP are sent initially to the resident NCOLP course, where they gain a broad and comprehensive knowledge of logistics, specifically at unit, division, corps, TAACOM, and wholesale levels. The course covers the logistical spectrum from unit movement to distribution management of major items at wholesale level.

After satisfactorily completing the resident NCOLP course, the member is awarded the "K" SQI. The careers of these members are then developed through assignments to increasingly challenging NCOLP positions, such as unit, brigade, division, corps, field army, and wholesale levels, or to a combination of these.

AR 614-200 contains additional courses the NCOLP member can take to see that he gets broad training in logistical functions with equal emphasis on supply, maintenance, transportation, and management, and on the way these disciplines fit together.

A trained NCO logistician can be the backbone of a logistics system and the means of adequate logistical support early in any military contingency. He can also be the source of training for less experienced junior officers.

TEST OF STRENGTH

The Army now has a test that measures each prospective enlistee's physical strength — the Military Entrance Physical Strength Capacity Test (MEPSCAT). Its measurements were established by the ability of soldiers to lift varying weights, much as they do regularly on the job.

Military guidance counselors use these measurements, along with mental, moral, and medical evaluations, to advise all applicants for Army service in selecting their military jobs.

For example, 80 pounds is the standard used to evaluate a person's potential for success in jobs that require "heavy" or "very heavy" lifting. This does not mean that a person who cannot lift 80 pounds will not be allowed to enlist for a job in the heavy or very heavy category, if other classification criteria permit it; it is a guideline only.

MEPSCAT is not designed to scare off people who want to become soldiers but to improve Army readiness by matching new soldiers better with Army jobs. In addition, it will increase a soldier's chances of succeeding at the occupation he chooses.

MOS CUTOFF SCORES

All soldiers, noncommissioned officers, and commanders, too, often find it difficult to understand how the promotion system works and why the promotion point cutoff score for a given MOS is so high.

But there is a reason for MOS cutoff scores getting higher or lower, and there is also a way a soldier can help himself get faster promotions.

The total number of promotions for each grade, regardless of MOS, is decided by comparing the number of soldiers authorized for that grade with the number the Army's budget allows. The number authorized includes losses, reductions, and promotions, both in and out of grade. In addition, new equipment or training developments influence the need for cutoff scores in certain MOSs to go up or down.

Promotions are given first to the MOSs with the greatest need. When an MOS is overstrength, the cutoff scores for promotion points are raised, and fewer soldiers in that MOS are promoted. And this creates a chain reaction down the line: When the higher ranks are not being promoted, there are no vacancies for the lower ranks to be promoted into.

Understrength MOSs, on the other hand, have lower promotion point cutoffs. And this is where a soldier can help himself get promoted — he can reclassify into one of these shortage MOSs.

DA Circular 611-83 shows which MOSs are understrength and which offer selective reenlistment bonuses (SRBs). Unit reenlistment NCOs can also offer information about reclassifying or changing to a different MOS, and can tell a soldier about the SRBs, which change monthly.

Any soldier who really wants to improve his chances for promotion should call his local military personnel office for more information about the promotion system.

SPECIAL FORCES

A change in Army regulations now permits soldiers with any MOS to apply for Special Forces training, although applications had originally been limited to soldiers in six feeder MOSs. All other former selection criteria still apply.

Soldiers must not have received Article 15s or higher punishment for a drug-related offense.

Local Military Personnel Offices have detailed guidance for applying.

OFFICERS CAREER NOTES

ASSIGNMENT PATTERNS

Since September 1983, the officers at Infantry Branch have taken nine field trips, during which they talked with more than 1,000 officers. Additionally, in the past seven months about 700 Infantry officers have come to visit us at MILPERCEN. The major subject of all of these talks has been "typical assignment patterns." Although assignment patterns are never "typical," certain policies and procedures are used in making all assignments, and these policies and procedures may need to be clarified.

Infantry Branch uses four categories of duties in describing assignments — two with troops and two without:

- Initial Specialty (INSPEC) with troops.
- Additional Specialty (ADSPEC) with troops.
- INSPEC, without troops.
- ADSPEC, without troops.

An INSPEC or ADSPEC assignment with troops is one to an installation where a brigade or battalion is stationed. There, an officer has the opportunity to work in a position at brigade level or lower. (Remember that Infantry Branch assigns officers only to major commands or installations.) Assignments at brigade or below are made by the personnel managers at each level. Each individual officer must take steps to get such an assignment. If an officer cannot get an assignment at brigade level or below while on an assignment with troops, assignment officers still view such an assignment as being with troops.

The officers who are selected to go back to INSPEC or ADSPEC assignments with troops are those who have been away from troops the longest. Next in line for these assignments are officers who have had an INSPEC or ADSPEC assignment with troops but failed to be assigned to a unit at brigade or below. The decision on whether an officer is to be assigned with troops or without troops is based on his assignment history and his branch qualifications. The amount of time an officer spends with troops is used as a discriminator in determining his future assignments.

Branch qualification criteria remain unchanged. An officer is considered branch qualified if he has had at least 12 months of TOE experience, has successfully completed the advanced course, and has successfully commanded a company. A lieutenant who does not receive a TOE assignment before going to the advanced course will go to a TOE assignment afterward. Once an officer is branch qualified, he can expect INSPEC or ADSPEC assignments away from troops.

Many of the assignments in the four categories require a nomination; many, however, do not. The term "nominative," therefore, is not an accurate description of an assignment.

As always, an officer should consider each of his jobs important, accept the challenge, and perform well. Success will follow.

COUNSELING

A review of the Officer Evaluation Reports coming in on some junior officers indicates a need for their commanders to do a better job of counseling them. Occasionally, an annual report contains lower marks and less-favorable comments than a relief for cause report would. Yet conversations with the officers concerned reveal that they were not counseled at all or, in some cases, that the counseling they received was *favorable.*

By the time an officer is commissioned, the Army has invested a good deal of time and resources in him. Failure to develop him to his fullest potential is not fair to him or to the Army.

Every commander, therefore, should take time to counsel his subordinates. They are eager for feedback, and a lack of negative feedback is often perceived as support. It's easy to sit back and say nothing and then "hammer" a junior officer on his OER or build a case for relief. But what subordinates need is the guidance and experience that only the insight of a more experienced officer can provide.

It does not take many below-average OERs to make an officer noncompetitive. It is far better for a commander to counsel a junior officer and monitor his progress (or lack of it) than to give him his first critique in the form of an OER that will be a permanent part of his record.

Not all newly commissioned officers are destined to become career officers, but the officer corps must try to develop all of them to their fullest potential.

UPDATING RECORDS

Each year as the promotion and selection boards prepare to convene, concerned officers rush to get their records in order. Invariably there is a great deal of confusion regarding what should be in their records and how it should get there.

These records include the following:

- Field 201 File — Military Personnel Record Jacket (MPRJ). Maintained by the local MILPO and used by the unit personnel office.

• Career Management Information File (CMIF). Maintained for personnel actions by Infantry Branch; used for assignment and professional development.

• Official Military Personnel File (OMPF). Maintained at MILPERCEN on microfiche by the Records Services Branch, PERSINSD; used by promotion and selection boards.

The OMPF contains two items that are critical to both assignment and promotion functions — the Officer Record Brief (ORB) and the microfiche.

An officer's ORB includes several all-important items that he should always keep up to date: assignment history, civilian and military education, and physicals — height and weight — which are due at ages 25, 30, 35 (every five years).

Each officer should go to his MILPO each year during his birth month to review his ORB and correct any discrepancies.

The microfiche record is in three parts — Performance (P), Service (S), and (sometimes) Restricted (R) — with the following contents and uses:

• The performance fiche contains evaluation reports, awards, decorations, letters of commendation, Article 15s, courts-martial, letters of reprimand, course completions, and college transcripts. It is used by selection boards, career managers, the Army Board for Correction of Military Records (ABCMR), and for other personnel actions. (For letters of commendation to be placed in his file, the officer's name must appear in the basic letter, and a statement that it is to be filed in his OMPF must appear in it.)

• The service fiche contains the accession package, promotion orders, extension of service agreements, RA appointments, and other data required for service computation. It is used by career managers, by the ABCMR, and for service computation. It is not normally seen by selection boards.

• The restricted fiche (when there is one) contains denied OER appeals, courts-martial with no finding of guilty, wholly-set-aside courts-martial or Article 15s, and ABCMR case documents. It is seen only by the individual officer concerned and the ABCMR. It is not released to selection boards or other agencies without special permission or written request from the individual concerned.

• An officer's performance fiche is critical because it provides promotion boards with his evaluation reports, awards, and commendatory documents. He should make sure that all of his evaluation reports, and *only* his, are properly recorded.

Photographs are required within 60 days of promotion to first lieutenant. After the initial photo, the officer is required to update his photo every four years. Boots are not authorized in official photos. (AR 640-30 contains specific instructions.) Photos are maintained in hard copy at Infantry Branch — not on the microfiche.

An officer need not make a special trip to MILPERCEN to check his OMPF. He may obtain a free copy of his microfiche and his most current ORB by writing to DA, MILPERCEN, ATTN: DAPC-MSR-S, 200 Stovall Street, Alexandria, VA 22332.

Officers are encouraged to visit their MILPOs and submit changes through their personnel officers. Anyone who encounters difficulty in trying to get items on his records corrected should forward a request, along with substantiation, to Infantry Branch, and we will assist him.

Any officer who wants to visit MILPERCEN to review his records should call Records Service Branch (AUTOVON 221-9618 or commercial 202/325-9618) 72 hours before his visit so that his official file will be available. No appointment is necessary for the visit itself.

ACTIVE GUARD/RESERVE

The U.S. Army Reserve's Active Guard/Reserve management program (AGR) is now five years old. Its goal is to improve the mobilization readiness posture of the Army Reserve. The program has proved not only effective but essential in attaining that goal.

The program's strength increased in Fiscal Year 1983 to more than 8,200 highly skilled and experienced Army Reserve officers and enlisted soldiers serving on active duty in USAR AGR status. These people serve in various duty positions within Army Reserve major commands and troop program units; Headquarters, Department of the Army, and commands throughout the United States, Europe, and Korea.

The program is to be expanded to more than 15,000 by the end of Fiscal Year 1985 and to more than 27,000 through Fiscal Year 1989. Only the best qualified Army Reservists become members of the program, and to be retained they must continue to display these attributes.

For information concerning application procedures and board schedules, interested Reservists should contact their personnel management officers/career counselors.

ARPERCEN PMOs

The Army Reserve Personnel Center (ARPERCEN) Personnel Management Officers (PMOs) are the same people who were previously the PMOs at the Reserve Components Personnel and Administration Center (RCPAC).

They are advisors and managers of the careers of officers and warrant officers who make up the Ready Reserve. This includes members of the Individual Ready Reserve (IRR) and Individual Mobilization Augmentees (IMAs), all of whom must bolster the strength of our nation's total Army in case of a national emergency.

The PMOs for Active/Guard Reserve (AGR) officers perform slightly different tasks. These PMOs are functionally oriented; they manage both individuals and positions to accomplish mobilization goals. Acting as guidance counselors, AGR PMOs initiate actions and monitor their progression, answering officers' questions, such as "When do I go to school?" "What is my next assignment?" and "What is best for my career?"

BOOK REVIEWS

The first issue of a new periodical that should be of great interest to the military professional has recently come our way. It is titled CURRENT MILITARY LITERATURE and will be published on a bi-monthly schedule by The Military Press in Oxford, England.

It contains comments on and abstracts and citations of selected articles from more than 100 military and defense periodicals — including INFANTRY — published in countries throughout the world.

Subscription information is available from The Military Press Limited, 92a Church Way, Iffley, Oxford OX4 4EF, England.

Another new and most interesting periodical is JANE'S DEFENCE WEEKLY, the first issue of which appeared in mid-January 1984. It takes the place of the previously published JANE'S DEFENCE REVIEW, and covers military happenings throughout the world in a highly readable and straightforward manner. Subscription information is available from Jane's Publishing, 286 Congress Street, Russia Wharf, Boston, MA 02210.

Here are a number of fine reference books we had received within the past few weeks:

• JANE'S INFANTRY WEAPONS, 1983-1984. Ninth Edition. Edited by Ian V. Hogg (Jane's Publishing, 1983. 903 Pages. $140.00). Although this is only one of fourteen yearbooks issued by Jane's, it is, for Infantrymen everywhere, an indispensible reference work. Descriptive narratives, photographs, diagrams, and data sheets are all used to the best advantage by the editor, whose name appears frequently in our book review section, and who always writes interesting Forewords. (Hogg succeeded to the editorship of this particular publication upon the death of Colonel John Weeks in early 1983.)

Separate sections contain detailed and authoritative information on revolvers and pistols, rifles, machine-guns, grenades, mortars, cannon in the 20mm to 30mm range, close support rocket launchers, antiaircraft and antiarmor weapons, ammunition, and flamethrowers. There are also separate chapters on electronics and optics (sights, rangefinders, target designators, and infantry surveillance radars), training aids and simulators, body armor, national inventories, and an alphabetical index.

In short, there is no better reference book of its kind on the market today.

• JANE'S ARMOUR AND ARTILLERY, 1982-1983. Third Edition. Edited by Christopher F. Foss (Jane's Publishing, 1982. 924 Pages. $140.00). This book nicely complements the one mentioned above and is rapidly becoming another of those indispensible books for Infantrymen, particularly as they themselves become more technically oriented toward vehicles.

Like Ian Hogg, Christopher Foss is an acknowledged expert in his field — his Foreword attests to that. And his book contains detailed and authoritative information on the world's tanks, reconnaissance vehicles, armored personnel carriers and infantry fighting vehicles, towed and self-propelled guns and howitzers, self-propelled tank destroyers, self-propelled antiaircraft guns and surface-to-air missiles, towed antiaircraft guns, multiple rocket launchers, ammunition, turrets, cupolas, engines, and powerpacks, and training equipment and simulators.

• JANE'S WEAPON SYSTEMS, 1982-1983. 13th Edition. Edited by Ronald T. Pretty (Jane's Publishing, 1982. 1,043 Pages. $140.00). As its title implies, this volume in the Jane's yearbook series contains detailed information about both strategic and tactical weapon systems, including surface-to-surface, surface-to-air, air-to-air, and air-to-surface systems. The analysis section, which is arranged in a tabular format, is particularly interesting and useful. There is some overlap with the Jane's volumes mentioned above, but not enough to to be annoying.

NOTE TO READERS: All of the books mentioned in this review section may be purchased directly from the publisher or from your nearest book dealer. We will furnish a publisher's address on request.

• ONE PEOPLE, ONE REICH: ENAMELED ORGANIZATIONAL BADGES OF GERMANY, 1918-1945. By J.R. Cone (M.C.N. Press, 1984. 99 Pages. $12.95, Softbound). This book has been prepared primarily for the collector of military memorabilia. At the same time it is a quite useful publication in other ways, because it does contain a considerable amount of information on the German organizations and their way of operating in Hitler's Third Reich. As the title clearly points out, the author's purpose is to highlight those political and state organizations within Germany that used enameled organizational badges and pins to further their cause.

• ENCYCLOPEDIA OF GOVERNMENTAL ADVISORY ORGANIZATIONS. Fourth Edition. Edited by Denise Allard Adzigian (Gale Research Company, 1983. 964 Pages. $350.00). This book provides detailed coverage of the many groups that advise the President, the Congress, and the various departments, bureaus, and committees of all branches of the government. More than 3,900 such groups are identified and described, each in a detailed entry. The entries are arranged in the main part of the directory under ten broad subject categories, and a single

alphabetical and keyword index identifies the specific advisory bodies. Groups that have been done away with are also included if they are of historical interest and if they issued important publications and reports.

HUMAN FACTORS IN MECHANIZED WARFARE, by Richard E. Simpkin (Pergamon Press, 1983. 173 Pages. $29.50).

The author, a retired British Army Brigadier and long-serving armor officer, offers his thoughts on a future general war that includes nuclear, biological, and chemical weapons from its start, and again advances his belief in the overriding importance of the tank on the battlefield of the future.

How will tank crewmen and mechanized infantrymen live and eat and exercise if they cannot leave their vehicles? How long will they be able to survive under those conditions? What uniforms should they have; what rations should they eat; what special exercises can they perform to keep themselves physically fit? These are some of the questions the author poses and attempts to answer. They are important questions, and certainly his suggested solutions are worth considering.

At the same time, Brigadier Simpkin advances his theory that tank crewmen should be carefully selected individuals, and that they should be treated much as air crewmen are treated — others do most of the heavy, dirty work while they conserve their energies for fighting the battle. He feels the same criteria used for selecting pilots should be used for selecting the crewmen of our main battle tanks. Simpkin feels that individuals so selected would be far better able to adjust to the conditions of NBC warfare.

Too, he advocates smaller infantry squad sizes — perhaps seven soldiers — and suggests that these infantrymen should seldom fight away from their vehicles. Their main function, as Simpkin sees it, is to protect the tanks, which will be the decisive element on the battlefield.

Apart from his theories about living and operating under NBC conditions for extended periods of time, the author's advocacy of the tank and "select" tank crewmen smacks of the writings about the "horse cavalry" in the "old" days. Back then, many felt that service in any other branch was secondary and that infantrymen existed simply to be "horse-holders." His claims for the tank rival those of certain aviation advocates in World War II — leave it to us, we'll win the war for you. You just come along and watch the show — and hold our coats.

FROM SAVANNAH TO YORKTOWN: THE AMERICAN REVOLUTION IN THE SOUTH. By Henry Lumpkin (University of South Carolina Press, 1981. 346 Pages. $24.95). Reviewed by Captain Michael E. Long, United States Army.

The Yorktown Bicentennial in 1981 produced a plethora of historical volumes that drew considerable attention to the closing months of the American Revolution. Many of these books focused on the major personalities associated with the Yorktown campaign, while others emphasized the military strategy of the siege itself.

A different kind of volume has been written by Henry Lumpkin, who is a professor of history at the University of South Carolina. His book, about the Revolution in the southern colonies, covers the period from the early encounters in 1775 to the end of the war in 1783, although most of his narrative centers on the years between 1778 and 1781.

One of Lumpkin's more interesting chapters deals with the clandestine operations of Brigadier General Francis Marion, known to the British forces as "The Swamp Fox." Lumpkin describes Marion as "the model field commander, riding into battle at the head of his men but seldom participating in the actual fighting, pulling back from a situation as the situation demanded."

Lumpkin also draws on the rich resources of museums, government agencies, and recent archaeological excavations to portray uniforms and the construction of fortifications and weapon emplacements.

His book is an example of historical writing at its best and one that will hold the attention of any reader. It also makes a handsome addition to a personal library.

EMPIRES IN THE BALANCE. By H.P. Willmott (Naval Institute Press, 1982. 487 Pages. $24.95). Reviewed by Lieutenant Colonel C.T. Guthrie, United States Army.

This book is unique among military histories of World War II. Instead of concentrating on a single battle or campaign, or examining World War II from a single nation's perspective, the author analyzes Japanese theater strategy, its implementation, and the Allied response to it. Infinitely detailed, this book examines a relatively narrow period of the war — the first five months — in the Pacific from a multi-national, strategic perspective.

The heart of the book is a chronological analysis of those five months, beginning with the Japanese attack on Pearl Harbor in December 1941 and ending with the Doolittle raid on the Japanese mainland in the spring of 1942. The author is critical of the military commanders and the political leaders on both sides, and his criticism appears logical and well-supported by his evidence.

Willmott's book will appeal more to the student of World War II history than to the general reader. His in-depth analysis of this important but relatively short period of the war may leave the non-specialist with more questions than answers.

For the military historian, though, this book deserves attention. It is penetrating, well-researched, and thorough, and it presents a perspective of World War II in the Pacific that other authors often overlook.

THE FINAL COLLAPSE. By General Cao Van Vien (Center of Military History, United States

Army, 1983. 184 Pages, Softbound). Reviewed by Dr. Mike Fisher, University of Kansas.

The final curtain fell on a scene of wild disorder and utter chaos. At 1000, 30 April 1975, Lieutenant General Tranh Van Minh, the supreme South Vietnamese commander, ordered an end to all fighting. South Vietnam's struggle for freedom died with barely a whimper.

The years immediately preceding the surrender come into sharp focus in this slim monograph. The author, who chaired South Vietnam's Joint Chiefs of Staff from 1965 to 1975, tells of the events that followed the American withdrawal in 1972 and the signing of the Paris Accords a year later.

Writing from personal experience, sympathetic interviews, and available documents, Vien emphasizes the failures that led to the debacle that brought dishonor to the South Vietnamese military services during their country's final hour. His analysis of the South Vietnamese effort will disturb many, particularly those involved in the conflict in that tragic land. But he also makes a strong case for America's contribution to that failure.

Vien admits that the United States contributed heavily to the personnel and logistical readiness of the South Vietnamese forces during the halycon years when one million men were under arms in South Vietnam. But he contends that that support proved the weak link in the ability of the South Vietnamese forces not only to endure but to prevail. For when U.S. support changed from graduated response to graduated withdrawal, the South Vietnamese simply could not meet the increasing North Vietnamese challenge.

Despite the obvious grounds for disagreement with the author's thesis that failure rested with the Americans, this book does warrant a careful reading by soldiers of all ranks. It flows in an easy rhythm that mirrors the clarity and precision of the author's mind, and he easily weds specific events to general military maxims. Vien manages to pull together the obtuse parts of a complex equation, proceeding logically to solution and analysis. One wonders, though, why these abilities lay dormant during the ten years Vien served as chairman of the Joint Chiefs of Staff of the South Vietnamese armed forces.

THE NON-NUCLEAR DEFENSE OF CITIES: THE HIGH FRONTIER SPACE-BASED DEFENSE AGAINST ICBM ATTACK. By Daniel O. Graham (Abt Books, 1983. 152 Pages. $25.00). Reviewed by Lieutenant Roy F. Houchin II, United States Air Force.

Calling on a wide range of experts, the author has compiled a most interesting and informative alternative to our present defense doctrine of mutual assured destruction — assured survival, based on the concepts outlined in the so-called High Frontier Study.

This study conceived a system made up of a combination of space-borne boost-phase and mid-point interceptors to attack ballistic missiles, as well as a ground-based missile defensive system, all using non-nuclear mechanisms.

The author describes how such a system could be developed by the military services and put into use before 1990. He believes the system would be technologically feasible, fiscally responsible, and politically practical. He also includes a table that outlines the prerequisites for the rapid and efficient acquisition of the system. Although the political and popular appeals of the High Frontier concept are reported as being favorable, its practical aspects remain to be tested — and that depends on the Congress and the American public.

THE BATTLE FOR THE FALKLANDS. By Max Hastings and Simon Jenkins (Norton, 1983. 384 Pages. $17.50). Reviewed by Leroy Thompson, Festus, Missouri.

Although many books have appeared on the South Atlantic War, this one is by far the best, especially in its coverage of the ground conflict. Max Hastings, like other correspondents who have written books about the war, was in the South Atlantic with the British task force. But he is also an ex-paratrooper and a well-regarded military historian. As a result of his background, he was accepted as one of their own by the assault troops of the Parachute Regiment and by the Royal Marine Commandos. Accordingly, he was able to get a good inside view of the drive for Port Stanley.

Hastings' work in the book is well complemented by that of Simon Jenkins, who covered the war in Whitehall. Jenkins reports the political maneuvering in London and Washington and at the United Nations, and he does a good job of analyzing why Argentina thought the British would not respond to the invasion. His political coverage is well done and offers some interesting thoughts on a western democracy fighting a war under the microscope of public opinion.

Still, this book is at its best on its coverage of the ground conflict and has the best general coverage of the operations of the 3d Commando Brigade, the 5th Brigade, and the SAS/SBS raiding units. For those interested in tactics, the book contains some good hard data on the Goose Green battle and the "Battle for the Mountains" around Port Stanley. The logistical side of the operation is also covered, and the reader gains an appreciation for the gamble Britain took in going to war so far from home with a navy geared to anti-submarine warfare with NATO support.

HUMANITY IN WARFARE, by Geoffrey Best (Columbia University Press, 1980. 400 Pages). Reviewed by Lieutenant Colonel John C. Spence III, United States Army Reserve.

This is a well-written history of the idea that there ought to be some humanitarian limitations on how warfare is conducted. It is dedicated to the memory of the late Piers Boissier, who was a member of the International

Committee of the Red Cross (ICRC). Indeed, as Geoffrey Best points out, the ICRC played an important role in the latter part of the 19th Century in the formulation of the Hague Conventions. Furthermore, the ICRC is still very much involved in adding new provisions to the Geneva Conventions.

Yet the contemporary norms and notions of humane treatment of noncombatants and prisoners of war found in the Hague and Geneva conventions have historical roots that go back as far as the Later Enlightenment period.

The student of military history and international relations will find the author's historical analysis thought-provoking. As a professional historian, Best shows that ideas of humane behavior in warfare changed with regard to the shifting balance of power and the advances in military technology and tactics in each historical era.

Obviously, in the pre-Napoleonic era, the ideas covering humane behavior in warfare were governed by the realities of that historical period. Similarly, the advent of nuclear weapons has revolutionized contemporary thinking on the nature of war itself.

As a result of the nuclear age, as Best points out, "The law of war was turned on its head. Discrimination of targets, economy of force, minimization of civilian damage flew out of the window."

The author, a professor of history at the University of Sussex, has done an admirable job of describing the somewhat circuitous development of the law of warfare up to the present time. When he has finished reading the book, hopefully the reader will feel that humanitarian limitations on how war is conducted are increasing rather than decreasing.

THE SCHWEINFURT-REGENSBURG MISSION, by Martin Middlebrook (Scribner's, 1983. 363 Pages. $22.50). Reviewed by Lieutenant Colonel Jack Mudie, United States Air Force Retired.

On 17 August 1943, 376 B-17 bombers of the Eighth United States Air Force set out from their bases in England on a double mission deep into Germany — 146 were to bomb the Messerschmitt aircraft plants at Regensburg and then proceed over the Alps to post-strike bases in North Africa, while the larger force of 230 bombers were to bomb the ball-bearing center at Schweinfurt.

The latter force was to return to its bases in England after delivering what the Army Air Force planners believed would be a critical blow to the entire German war production capability. Ball bearings were a vital part of Germany's sophisticated weapon industry, and almost half of them were produced in the factories centralized at Schweinfurt.

The attacks cost the Eighth Air Force 60 B-17s (24 at Regensburg, 36 at Schweinfurt) with their 600 crew members and these losses were a severe blow to the AAF's daylight precision bombing program. The German air force lost 42 aircraft, although the U.S. bomber crews reported 288 German aircraft destroyed, 81 probables, and 103 damaged. The production of ball bearings was interrupted, but the failure on the part of the Allied air forces to follow up this attack more aggressively, especially after a second raid two months later, allowed the Germans to disperse the industry. (On the second attack, 14 October 1943 — "Black Thursday," it has been called since — the Eighth lost 60 of the 291 bombers it dispatched and another 600 crew members.)

Middlebrook, a well-known British writer, has written a jewel of a history of the double mission on 17 August. His eye for detail, especially in the numerous quotations he uses from survivors on both sides, is remarkable. His text is well illustrated, and his superb appendixes include a list of each of the aircraft that were destroyed on both sides as well as a roster of all of the airmen who were killed on that fateful day.

As a sidelight, Middlebrook lays to rest two United States Air Force legends. One of these legends is that of the "Abbeville Kids." The other is the story that the Luftwaffe deliberately singled out the 100th Bomb Group's B-17s because of an earlier alleged gear-dropping (surrender) incident in which a 100th crew that had promptly machinegunned the escorting German fighter. Middlebrook's convincing interviews with Luftwaffe and AAF veterans indicate that there was no such select group of German aces at Abbeville, and that the incident with the 100th Bomb Group's B-17 was neither deliberate nor followed up by a Luftwaffe vendetta.

General Curtis LeMay, the "tough, hard-hearted" man who led the Regensburg force as a colonel and later became the USAF's Chief of Staff, once wrote that "in the case of most war memorials, something happens inside your chest and behind your eyes when you read the inscription." This book, dedicated to the memory of those U.S. airmen who lost their lives while flying from the author's country during World War II, is such a memorial.

RECENT AND RECOMMENDED

SMALL ARMS AND CANNONS. By B.J. Marchant Smith and P.R. Halsam. Brassey's Battlefield Weapon Systems and Technology.

FROM HALF-TRACK TO LEOPARD 2: THE COMPLETE ILLUSTRATED HISTORY OF THE KRAUSS-MAFFEI ORDNANCE DEPARTMENT. By Walter J. Spielberger. The Nautical and Aviation Publishing Company of America, 1982. 316 Pages. $39.95.

THE GERMAN SNIPER, 1914-1945. By Peter R. Senich. Paladin Press, 1982. 445 Pages. $49.95.

19 STARS: A STUDY IN MILITARY CHARACTER AND LEADERSHIP. By Edgar F. Puryear, Jr. A Reprint. Presidio Press, 1981. 437 Pages. Softbound.

WESTERN HEMISPHERE STABILITY — THE LATIN AMERICAN CONNECTION. Edited by R. Daniel McMichael and John D. Paulus. National Strategy Information Center, 1983. 138 Pages. $7.00, Softbound.

NAVY AND EMPIRE. By James L. Stokesbury. William Morrow and Company, 1983. $16.95.

THE BOMB AND EUROPEAN SECURITY. By Guido Vigeveno. Indiana University Press, 1983. 131 Pages. $6.95, Softbound.

U.S. MARINES IN VIETNAM: AN EXPANDING WAR, 1966. By Jack Shulimson. Headquarters, U.S. Marine Corps, 1982. 390 Pages. Softbound.

INFANTRY LETTERS

CORRECTIONS — MARNE MANEUVER

Although I was pleased to see my article "Marne Maneuver Training" in print [INFANTRY, November-December 1983, page 34], I was bothered by the amount of editing done and by errors in Figure 1, which detracted from the explanation of the "move-set" drill employed with the company V and platoon wedge formations. Please correct and reprint the illustration.

In addition, your omission of the word "second" from line 8, column 3, page 34 further obscures rather than clarifies the explanation. That line should read "RED; SET, OUT. The *second* point element...."

Incidentally, the company V is sometimes used employing the traveling or traveling overwatch technique as well as the bounding overwatch technique explained in conjunction with the move-set drill.

RICHARD J. MORGAN, JR.
LTC, Infantry
1st Battalion, 30th Infantry
3d Infantry Division

EDITOR'S NOTE: Our sincere apologies to Colonel Morgan for these errors. Figure 1, as corrected, is shown here, and the paragraph in question should read as follows:

The first point element reports, "SIX, THIS IS RED: MOVE, OUT," then moves, establishes its bound position, and reports, "SIX, THIS IS RED; SET, OUT." The second point element moves automatically when the first element reports SET. Then the second reports, "SIX, THIS IS WHITE; MOVE, OUT," establishes its bound position, and reports, "SIX, THIS IS WHITE; SET, OUT." Then, rhythmically, the first element reports and moves automatically when the second element reports "SET," and so on. The apex element keys its advance and automatically displaces on the advance of the point element.

As for the amount of editing done on Colonel Morgan's article, we did no more than we normally do to meet INFANTRY's editorial standards. We certainly never intentionally change an author's meaning.

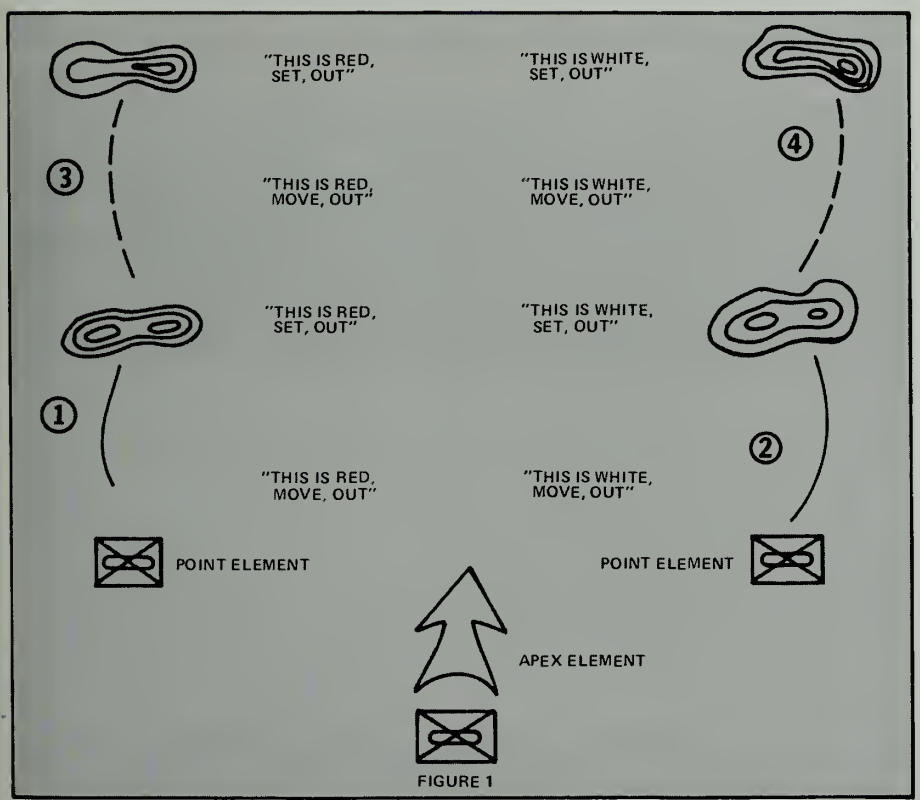


FIGURE 1

GRAPHIC FIRING TABLE

Here at the Mortar Division, Weapons, Gunnery and Maintenance Department of the Infantry School, we read with interest the article "FDC Techniques," by Lieutenant Stephen Perkins, in the November-December 1983 issue of INFANTRY (page 13).

Lieutenant Perkins makes several good points in his article. Time is indeed a critical factor on the modern battlefield, and any shortcut that can safely reduce computation time in an FDC will ultimately save lives. Also, the Army does need a better means of obtaining firing data for 81mm and 60mm mortars. But his solution, the graphic firing table (GFT), although workable, is not really worthwhile for adoption Army-wide for the following reasons:

First, the GFT Lieutenant Perkins describes is very similar to the printed range arm that was tested here in the late 1970s and early 1980s. This tool was rejected because the FDC computer needs the versatility of the firing table in all situations, especially when a high angle of fire is needed (as in mountain or urban terrain).

The second reason concerns the new ammunition being fielded, which could make a GFT a hazard. An FDC that used a GFT showing charges and elevations for the HE M374A2 round might make serious errors if the guns were firing HE M374A3 ammunition instead. Naturally, this would mean that the FDC would have to carry different GFTs for each type and model of round — more paper to misplace.

Finally, the M-23 mortar ballistic computer is replacing the M16 plotting board and the graphical firing fan (GFF) as the primary means of fire control in the mortar platoons. The M-23 is programmed for all the current mortar ammunition for the 60mm, 81mm, and 107mm mortars, and would make the proposed GFT obsolete overnight.

This new technology, combined with other proposed combat developments and our mortar expertise, will ensure that Infantry mortar platoons achieve the higher standards envisioned by Lieutenant Perkins.

MARK E MERCER
CPT, Infantry
Fort Benning, Georgia

HEROES

I have just finished reading the Infantry in Action section of the latest edition of INFANTRY magazine and am trying now to organize and control my thoughts relating to the action described. [See "Heroes Born of Battle," November-December 1983, page 28.]

I was a member of Company B, 1st Battalion (Airborne), 12th Cavalry when we air-assaulted into Hoa Hoi on 2 October 1966. The time was much closer to 0915 than 1005 as stated in the official version, the company having been diverted while enroute to establish a road block and a POW holding area on QL 1 at the Phu Ly Bridge. One of the unusual aspects of this was that a "lift" was scheduled for the whole company at one time.

It is gratifying to see in print the names of some very courageous members of our unit, two of whom I knew personally. There were others, too, who were seriously wounded during the action and contributed much, but they were apparently omitted from the official version.

I do not know whether the Infantry School has access to a French documentary film entitled "The Anderson Platoon," but if it does, anyone who views it will find an almost scene-by-scene sequence of events on those two fateful days.

Although I do not know where the rest of the surviving members of Company B are today, I hope they are able to read this article and realize that our efforts have not gone unsung. We never questioned whether it was right or wrong, we just did our job, as soldiers and as members of the Airborne Infantry.

GERALD W. DOLLOFF
1SG, USAR
187th Infantry Brigade (Sep)
Pittsfield, Massachusetts

REFLECTIONS ON FORT BENNING

My first visit to Fort Benning had come in the summer of 1967, Infantry orientation week for the West Point Class of 1969. The war in Vietnam was picking up, and the various branches were competing for the Best of the Line, as the class called itself. My second visit had come in 1969, the war in full bloom then, and the Infantry officers of the Class of '69 were on their way with a stopoff at Ranger, Airborne, and the Basic Course. By my third visit in 1974, for the Advanced Course this time, the numbers of the Best of the Line had been decreased through deaths, wounds, resignations, and branch transfers. So transpired three visits and three good exposures to the heart of the Army, the Home of the Infantry, the soul of the nation's defense.

But my eyes had been young and eager then, and too immersed in the times to really see Fort Benning. My thoughts had been too preoccupied with the "next post," the next event, to appreciate the meaning of the historic military fort astride the Chattahoochee. It took a fourth visit, in October 1983, to put the post in perspective, to see its place in our Army, and its meaning to our country.

Perhaps it was the coincidence of the short, two-week visit, with the tragedy of mass Marine casualties in Beirut, and with the combined forces invasion of Grenada. But whatever it was, the snapshots of people and places at the old post came into focus at last: Fort Benning — no backwater post this — but the heart and soul of an American people, bursting with pride, and determined to be free.

The post's manicured lawns and neatly trimmed trees indicate the order and discipline that exist in their midst. Soldiers, trim and fit, call a vibrant cadence as they run in neat formations to their classes. The majestic 200-foot airborne towers rise silently above their surroundings, beckoning men to adventure and danger, daring them to raise both their bodies and their spirits to new heights. Infantry Hall — Building 4 — stands solid as a fortress as it instructs its young officers, officers-to-be, and noncommissioned officers in a regimen of tactical doctrine and professional commitment.

"Listen," it says, "I will teach you how to fight. I will show you the way forward when you are tired and frightened. I will pass on to you what others before you have learned in trials of fire, and I will send you forth to lead others at the cutting edge of the defense of America."

And in the distance, at Sand Hill and Harmony Church, the youth of America assemble; they will be led by those passing through Infantry Hall. They arrive with their long hair and their frightened looks, and they are shorn of both their locks and their preconceived notions of what the Army is. They come in awe, but they leave in dignity, ready to serve, eager to do well in service to their country, their Army, their leaders.

The pulse of Fort Benning is vibrant. The air is filled with excitement, anticipation, pride, and energy.

The instructors are sharp; they look and talk like professionals. The roar of the aircraft engines at Lawson Field excites the imagination. An occasional Ranger makes his appearance at the post proper, a reminder of the Ranger Camp where hard men are turned into even harder men, ready to fight anywhere, anytime. The post is alive with effort — studying, running, jumping — thousands of men and women trying to be a little better, a little smarter, a little more committed.

Look into their eyes, America, and reflect on the well-being of the nation. The hard years of Vietnam and its aftermath are behind us. Another generation of Americans has arrived — bigger, stronger, prouder, more ready to serve. The flag flew at half staff in October 1983; the bodies of our servicemen were coming home from Beirut and Grenada. The eyes of the recruits, the sergeants, the lieutenants, and the captains were sad, but they also sent a message of resolution. They said: We want to serve, to do our share, to take our chances.

Fort Benning has persevered. It continues to do its job. It molds bodies and it molds minds. For that it can take much credit. But it is given a wonderful raw material with which to work — America's youth, no longer on a binge of hedonism, but a youth in search of itself in the traditional values that have marked America's greatness — courage, commitment, selflessness, and dignity.

Like a rock, Fort Benning has withstood the wave of self-condemnation that permeated our society in the 1970s. Here and there, perhaps, a piece was chipped away. (My own eyes were saddened by the absence of a Vietnam section in the Infantry Museum, which stands within earshot of where so many of my peers were trained for their final battle in that Infantry war.) But in the main, the Home of the Infantry remains untouched. Serenely, it has waited for America's youth to come home, home to their identity as Americans, proud, free, and courageous.

The mission of the Infantry is to close with and destroy the enemy. But the Home of the Infantry, Fort Benning, does not stand for death. It stands for life, a life of freedom and dignity, a life enriched by the greatest government the world has ever known. For Fort Benning exists to preserve that government and the great nation that has fostered it.

Go to Fort Benning and be reassured that America will prosper. Sense its history, its pride, and its purpose. But most of all, look at its people. They are America's youth, the best of our nation, the hope of our future. Look at them and know our greatness. In them, and in their successors, we shall always be free.

JIM McDONOUGH
LTC, Infantry
Fort Hood, Texas

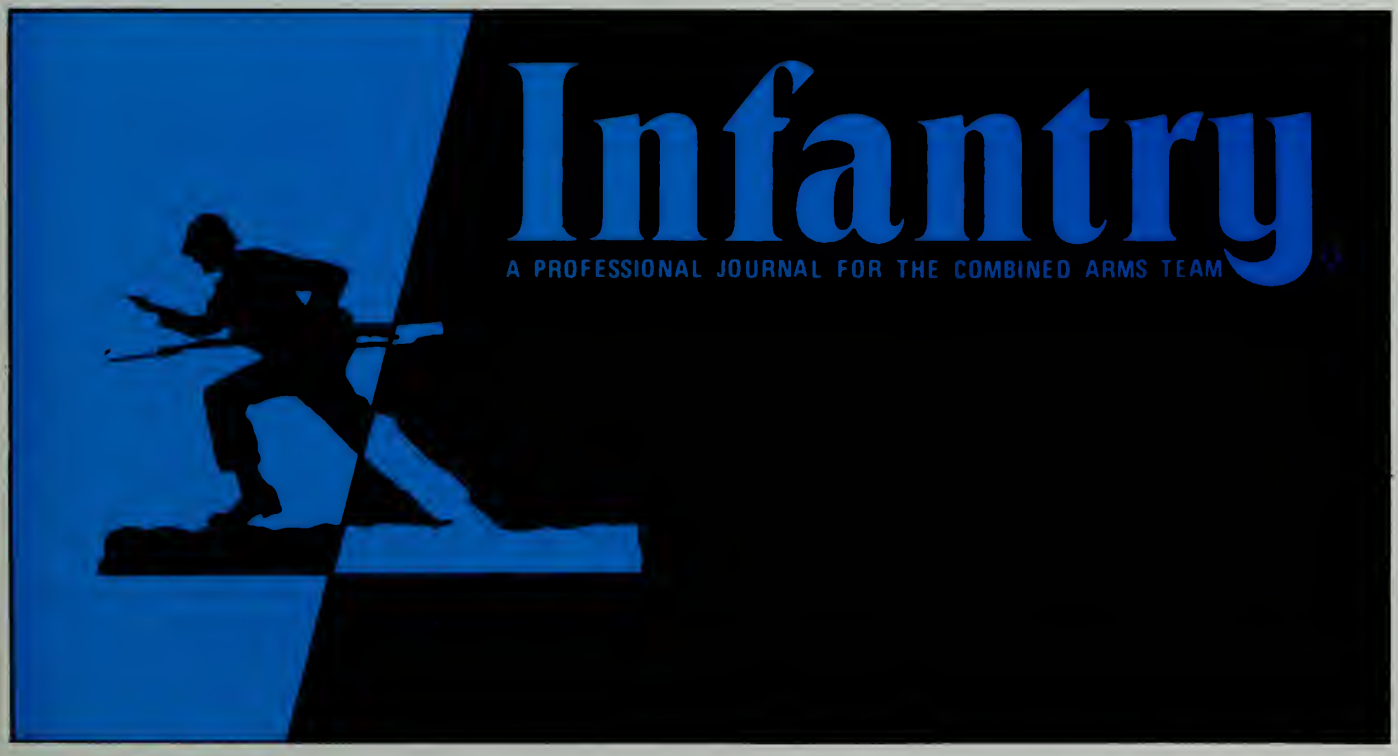
COMPANY XO

In the November-December 1969 issue of INFANTRY Magazine, you published an article that dealt with the company executive officer. I have kept that article for all these years, for it has been the only one I have found during my career that clearly states *what an XO is supposed to do.*

Would it be possible for you to print the article once again for the "newer" generation of company grade officers? Time and tactics have changed, but the roles of the XO as given in this article have remained the same.

RONALD R. SOMMER
LTC, Infantry
Maryland Army National Guard
Baltimore, Maryland

EDITOR'S NOTE: The article Colonel Sommer refers to is indeed an ex-



cellent one; and we would like to be able to reprint it as he suggests. But we do not believe that reprinting an old article at this time would make the best use of the space in the magazine.

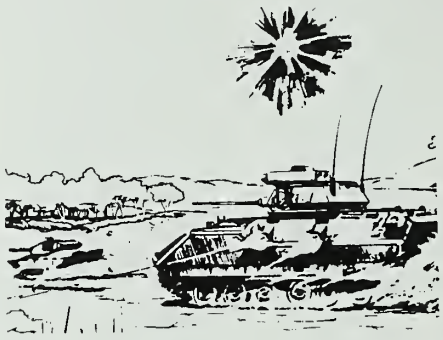
The original is still available, of course — most military libraries have INFANTRY on file — and we highly recommend it: "The Company XO," by Lieutenant Colonel John R. Galvin, November-December 1969, page 34.

MILES DRAGON

As a Dragon gunnery instructor, I was very interested to read Major Curtis L. Devan's article on Dragon training in the September-October 1983 issue of INFANTRY (page 33). While I agree with him completely on the shortcomings of both the Launch Effects Trainer (LET) and the MILES Dragon, the article does contain a technical error that might cause confusion.

The article states that the MILES Dragon's probability of kill against a tank is only 76 percent, given a one-shot hit. But this is true only of the MILES tank detector system. The probability of kill is different for each *type* of target system. If the MILES Dragon is fired at an M113, for instance, the probability of kill is increased to 98 percent, and against a man-worn detector system harness it is 100 percent.

This is true because the hit-kill probability is determined by the target's on-board computer, not by the Dragon transmitter, as stated in the article. The hit-kill probability is programmed into the computer (variously known as the control con-



sole or the loader's control assembly) according to formulas developed at Aberdeen Proving Ground. The computer "reads" all incoming laser signals and differentiates between the types of weapons being fired at it. Thus, a Viper has only a 48 percent chance of killing a tank with one shot, and an M16 rifle has no chance at all. (See TC 25-6, Tactical Engagement Simulation Training with MILES, Table 1-1.)

A unit can conduct successful tracking and engagement training exercises by attaching the man-worn harness to its M151s, APCs, or other available vehicles to act as uncooperative moving targets. This obviates the need for the cumbersome infra-red target devices and training console the LET requires, not to mention the batteries, grenade-launching ammunition, and the LET itself. While the MILES Dragon is not intended to replace the LET, it can allow units to train when the LET is not available or when resources are scarce.

It must be kept in mind that the MILES Dragon was designed as a tactical engagement simulation device, not as a gunnery trainer. Trainers in the field, however, have pressed it into service to help fill the gaps in gunnery training left by the field handling trainer and the LET.

Future generations of MILES equipment will indeed meet the requirements outlined by Major Devan and add even more flexibility to this exciting training system.

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U.S. Army Training Support Center
Fort Eustis, Virginia

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From The Editor

REPRINTS

When our readers ask us for reprints of articles from INFANTRY, we are always pleased, for that shows they have found our articles useful. Unfortunately, though, the size of our staff does not permit us to supply reprints. As an alternative we have made arrangements with a microfilm service to provide that service (for a fee, of course).

The organization is University Microfilms International, Article Reprint Service, 300 North Zeeb Road, Ann Arbor, Michigan 48106. Our overseas readers may order reprints either from that address or from University Microfilms International, 30-32 Mortimer Street, Department P.R., London W1N 7RA, England.

In addition, our index is now available either on a mini-database diskette or in a printed format from A to Z Independent Information Indexing, P.O. Box 2315, Rehovot, Israel. The cost for either the diskette or the print is $17.00 (U.S.), which includes air mail shipping costs.

In 1984, our index will also be available from Infordata International Incorporated, Suite 4602, 175 East Delaware Place, Chicago, Illinois 60611. The index will be in a microfiche format. No price has been established.

HOT LINES

The Infantry School maintains two hot lines for military callers for around-the-clock contact with the field. If you have a general question, or something of an immediate nature to pass on, the number to call is AUTOVON 835-4487 or commercial 404/545-4487. If you have a question dealing specifically with the Army Training and Evaluation Program (ARTEP), the number to call is AUTOVON 835-4759 or commercial 404/545-4759.

The recording equipment now in use limits messages to 30 seconds, so if you have a lengthy question or comment, send it in writing to Commandant, USAIS, ATTN: ATSH-SE, Fort Benning, GA 31905.

OUTSIDE BACK COVER:

An armored personnel carrier filled with soldiers from the 1st Battalion, 7th Infantry races towards the Czechoslovakian border after a "blowout" had been called. (Photograph courtesy of 3d Infantry Division Public Affairs Office)